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# THE PLACE OF 'PLASMA SUBSTITUTES' (DEXTRAN) IN A BLOOD-TRANSFUSION SERVICE *

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I wish to discuss briefly the therapeutic role, relative to that of blood, of 'plasma substitutes', which are perhaps more correctly termed blood-volume restorers or plasma expanders.

Plasma expanders may be described as synthetically prepared colloidal solutions which are administered intravascularly with the object of timeously restoring the circulating blood volume to normal in conditions in which it has been seriously reduced, e.g. traumatic shock and acute haemorrhage.

It has been clearly shown:

1. That the important factor which may kill in these conditions is usually not simple lack of haemoglobin, or of other chemical constituents of the blood, but the acute physical diminution in the circulating blood volume.

2. That, if the circulating blood volume in these conditions is timeously restored to normal by the infusion of a suitable plasma expander, the critical emergency may be safely tided over until the position is later rectified by the infusion of blood, plasma or serum, or by spontaneous restoration of the blood to normal.

3. That undue delay in restoring the circulating blood volume to normal in cases of acute traumatic shock or haemorrhage may allow of the development of irreversible damage to vital organs, so that delayed infusions, even of whole human blood or of plasma or serum, may prove of little avail. The time factor in the adjustment of the emergency situation is, therefore, of great importance.

There can be no argument but that the best treatment for serious depletion of circulating blood volume due to acute loss of blood is adequate and timeous infusion of the patient with compatible whole human blood. The best treatment of oligaemic shock due to plasma loss, such as so commonly complicates severe burns, is early and adequate infusion with human plasma or serum; but, in the absence of readily available blood, plasma or serum, the use of a suitable plasma-expander may be invaluable and the prompt administration of such a preparation may prove more beneficial to the patient than the delayed infusion of blood, plasma or serum.

*Plasma Expanders*

I do not wish in this short paper to enter into a detailed description of plasma expanders but I should like shortly to state that the need for such preparations has been recognized ever since the 1914-18 world war and that a great amount of research has been devoted to this problem. In recent years the position has been clarified by a clear appreciation of the rather complex qualities that are required of these preparations. Essentially a plasma expander is a colloidal solution, of appropriate strength and viscosity, of a substance which possesses similar molecular characteristics to those of human plasma-proteins so that, when a solution of it is infused into the blood stream of an oligaemic patient, it will remain there for a significant period of time maintaining appropriate osmotic relationships and not, like crystalloid solutions, rapidly diffusing out of the blood-vessels into the extravascular spaces. The result is that, when a suitable plasma-expander is administered intravascularly to the oligaemic patient, it will not only rapidly restore the circulating blood volume to normal but will maintain it for an appreciable and significant time. Naturally plasma expanders must also possess other very necessary positive and negative qualities. Thus, they should be clear sterile solutions which are non-toxic, non-haemolytic, non-antigenic and non-pyrogenic and they should be chemically stable and should be completely eliminated from the body within a reasonable period of time.

Numerous different preparations have been tried as

* A paper read at the Blood Transfusion Conference, Cape Town, September 1955. Published with the permission of the Secretary for Health.

plasma expanders, viz. gum acacia, pectin, gelatin and polyvinyl-pyrrolidone solutions, but only one to date—dextran—appears to be consistently satisfactory.

Dextran is a biosynthetic macro-molecular carbohydrate composed of linked glucose units and it is prepared by the enzymic action of leuconostoc bacteria on sucrose solutions.

Suitable solutions of properly purified dextran of appropirate molecular size would appear to possess virtually all the essential qualities required of plasma expanders, and have been very extensively and most successfully used for this purpose for over a decade in Sweden and during the last few years in the UK, the USA and other countries.

*Absence of Reactions*

Two main criticisms appear to have been levelled at dextran as a plasma expander. Firstly doubt has been expressed whether intravascularly administered dextran is completely eliminated from the body, and secondly there is the question of reactions caused by its therapeutic use. Satisfactory evidence has now been accumulated to prove that no harmful retention of dextran occurs in the body after its injection and that it is all completely eliminated by excretory and by metabolic processes within a reasonable period of time.

Though at first held to be non-antigenic, experimental evidence has been produced to show that dextran may act as an antigen, and a number of persons have been found who are allergic to this substance. It has been suggested that these persons may have become sensitized to dextran by eating sugar contaminated with it, but the more probable explanation is that they have acquired the sensitivity as a result of immunological experiences with micro-organisms which naturally elaborate dextran, e.g. certain types of pneumococci. Though certain observers in the USA have found that allergic reactions, e.g. urticaria, are relatively common in 'normal' subjects who are given small parenteral injections of dextran, experience has clearly shown that allergic manifestations are uncommon in oligaemic patients who are given large intravenous therapeutic doses of dextran. Thus, in England, in a survey of 1,647 patients treated by dextran infusions, Maycock[1] found that only 15 exhibited allergic reactions and only in 4 of these patients did these complications appear to be serious. Extensive Swedish experience supports these observations. These allergic reactions may be controlled by the use of adrenaline or by suitable anti-histaminic drugs. Pyrogenic reactions with dextran would appear to be less common than with whole blood, plasma or serum and, of course, reactions due to blood incompatabilities do not occur.

There is, thus, clear evidence to indicate that reactions in patients who are treated with dextran infusions are no more frequent or severe, and probably less so, than in patients infused with blood or blood products.

*Therapeutic Substances Regulations*

I may further add that the Union Health Department has classified plasma substitutes as scheduled therapeutic substances under the Therapeutic Substances Regulations of the Medical, Dental and Pharmacy Act, 1928. This means that importation into, or manufacture in, the Union of South Africa of plasma substitutes is controlled by licences issued by the Minister of Health. Licences are only granted if the preparations comply with the stringent standards for quality, purity and potency which are prescribed by these regulations. These standards, as they apply to dextran preparations, are based on the specifications for this substance laid down by the Medical Research Council of Great Britain. At present dextran preparations are the only plasma substitutes licensed under the regulations.

*The Place of Dextran*

Dextran preparations possess certain advantages over whole blood and blood products. Thus, dextran solutions are sterilized by autoclaving so that there is no danger whatever with them, as with blood, plasma or serum, of transmitting infective diseases, e.g. viral hepatitis. Dextran solutions are chemically stable and may be stored indefinitely without any special precautions, unlike whole blood which must be stored in a refrigerator and then for not more than 3 weeks. Pre-transfusion blood-tests are unnecessary with dextran. It is, however, always wise to take a sample of blood from a patient when administering dextran since it may be desirable to follow up this infusion with one of whole blood. Because of the formation of rouleaux in blood containing dextran, difficulty may be experienced in interpreting blood-group tests on samples of blood taken after dextran administration. Though this technical difficulty may be readily overcome in a laboratory by washing the erythrocytes before testing them against the antisera, it is perhaps always wiser to obviate any possible difficulties by collecting the sample of blood for testing before administering the dextran. Finally, dextran preparations are cheaper than blood, plasma or serum and their supply is virtually unlimited.

Despite these advantages which dextran preparations possess over blood and blood products, the advantages of the latter as therapeutic agents generally far outweigh those of dextran, so that there is no question of dextran ousting blood, plasma or serum; but, nevertheless, dextran preparations have an important therapeutic role to play which should not be considered as antagonistic to that of blood and blood products but complementary to them. The main use of dextran preparations appears to lie in two sets of circumstances, viz.:

(1) when blood, plasma or serum is urgently required in an emergency but is not immediately available, and

(2) when supplies of blood, plasma and serum are limited and have to be conserved.

In many small centres it is not practical to establish blood banks. When blood is required for transfusion purposes in these places and plasma or serum is not immediately available, as is often the case, blood must either be obtained from some distant bank or a local donor must be specifically bled. The position may be further complicated by lack of proper facilities for the immediate carrying out of the requisite pre-transfusion blood-tests. As a result serious delays may occur which may operate unfavourably for the patient unless dextran is immediately infused and perhaps followed up later by blood.

*Dextran and Blood-Transfusion Services*

With advances in surgery the demand for blood has been steadily increasing and blood-donor societies frequently experience difficulties in coping with demands. This is particularly so in South Africa, because blood is at present chiefly obtained from one section of the community only—the European. Under these circumstances, to ensure a continual and adequate supply of blood, there is a natural tendency to bleed donors at short intervals, e.g. 2–3 months. No doubt the majority of young healthy adults can safely afford to lose a pint of blood at this frequency but this does not necessarily apply to all donors and conservative medical opinion in Great Britain is that donors should only be bled at intervals of 6 months. To make a practice of bleeding donors more often than this may thus be unfair to some of them. If the increasing demands cannot be met by recruiting more donors, donors should not be bled more frequently than is perhaps wise but steps must be taken to make the best use of the limited supplies of blood available. The blood should be reserved for the patients who need it most and the remaining patients should be treated with suitable plasma-expanders, e.g. dextran solutions. The European section of the population cannot also be fairly expected to meet the major needs of the non-European and, if adequate supplies of blood cannot be obtained for non-European patients by organization on a sufficient scale of non-European blood-donor services, greater use should be made of dextran preparations amongst them, for it is far better for them to be treated with dextran than nothing at all if blood or blood products are not available.

To ensure the best distribution of blood, plasma and serum and to conserve supplies of these substances when they are limited, it is suggested that the decision whether to use blood, a blood product or a plasma expander should not be left to the surgeon alone but should be decided by consultation between him and the blood-transfusion officer.

This brings me to the final point that I wish to make. Plasma expanders must not be ignored by the blood-transfusion services but their true value should be appreciated and their use controlled, principally through blood-transfusion officers, with the object of making the best use of limited supplies of blood and preventing undue strain on the ever-willing donors.

REFERENCE

1. Maycock, W. d'A. (1952): Lancet, **1**, 1081.

## BENJAMIN FRANKLIN AND MEDICINE

GERTRUDE FAITH

The seventeenth of January 1956 marked the 250th anniversary of the birth of Benjamin Franklin, printer, author, inventor, scientist, statesman and diplomat.

Franklin was not a physician, yet he ranks among the medical leaders of his age. Physicians invited him to their meetings, and received him always as one of their own body. Many patients consulted him. Many doctors wrote to him for advice. Even Sir John Pringle begged Franklin to come and treat the daughter of the Duke of Ancaster at the time Franklin lived in London.

In 1751 Franklin promoted the founding of Pennsylvania Hospital, America's first public hospital. In 1777 he was elected a member of the Royal Medical Society of Paris and in 1784 he was appointed by the French king, Louis XVI, one of the commissioners to investigate the theories of Mesmer. In 1787 the Medical Society of London appointed him honorary member.

Franklin invented a flexible catheter, bifocal spectacles and a machine for showing circulation of the blood. He suggested the use of electricity in the treatment of paralysis, and he led a crusade for inoculation against smallpox in the British colonies.

Among his most valued correspondents were outstanding medical men of the day in England, France, Holland, Germany, Austria and America. One of his best friends, Dr. Jan Ingenhousz of Vienna, court physician to Maria Theresa and Joseph II, with whom he travelled in Engalnd and France, sought his advice before inoculating the young princes of the imperial family.

Dr. Barbeu Dubourg, a leading physician in Paris, translated Franklin's works into French and always addressed him as 'my dear master'. With Dr. John Fothergill, Franklin exchanged opinions on pathology and therapeutics as well as politics. In America Dr. Thomas Bond, Dr. John Bard, Dr. Thomas Cadwalader and Dr. Benjamin Rush begged Franklin to accept grateful dedications of their medical works. Dr. John Coakley Lettsom, the eminent English physician and founder of the General Dispensary in London, wrote a biography of Franklin.

During the investigation of Mesmer and mesmerism Franklin met Dr. Joseph-Ignace Guillotin, whose name survives in the guillotine. Franklin's was the first signature to the *rapport* to the king and the *expose* which was read to the French Academy of Sciences. The investigators reported that Mesmer's 'animal magnetism' had not been shown to exist.

Franklin's views on hygiene and the treatment of diseases were far ahead of his generation. At a time when houses were not fitted with baths and people bathed but seldom, he was an advocate of frequent bathing. He devised and practised air-bathing. He was the first to discover the poisonous quality which repeated respiration imparts to the air and was the originator of the modern science of ventilation. He called attention to the folly of excluding air from hospitals and sick rooms and preached the gospel of pure air and ventilation while everyone else slept with bedroom windows tightly closed.

Some of Franklin's recommendations for diet and health are explained in *Poor Richard's Almanack*. He said there: 'To lengthen your life, lessen your meals; dine with little, sup with less, do better still, sleep supperless; eat few suppers and you'll need few medicines'. Greater danger lay in overeating than in undereating, he warned.

Franklin's letters on the subject of lead poisoning are classics in literature. In one letter, he expressed the belief that lead poisoning among typesetters was due to the particles of metal swallowed with their food by slovenly workers who ate their meals without washing their hands.

His observations on the cause and cure of the common cold are still, for the most part, the fundamental knowledge that we have on the subject. In his *Preparatory Notes and Hints for Writing a Paper Concerning What is Called Catching Cold* are the following suggestions: '*How contracted*—By over-eating; by constipation; by coming in close contact with a person having a cold. *How treated*—Warming; exercise; perspiration; quinine taken early. *How prevented*—Temperate eating and drinking; warm clothing in winter; proper elimination; free sweating; avoiding contact with infected persons.' He suggested that colds are contracted from the 'effluvium' transmitted from people in a hot crowded room. Today the word is 'virus'.

Thus it may be said that Franklin, although he was not a graduate of any medical school, merited the title of Doctor of Medicine. Dr. William Pepper, in his book *The Medical Side of Benjamin Franklin*, says: 'It is our loss that we can only claim Franklin as a sort of adopted father of the profession'.

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## VAN DIE REDAKSIE

### TERING: INRIGTING- OF TUISVERPLEGING?

Gedurende die laaste tientalle jare was daar 'n aansienlike afname in tering in die meeste westerse lande—'n afname wat die hoop verwek dat hierdie kastyding van die mensdom nou op pad na uitdelging is, net soos die pestilensies van plaag, cholera, pokkies, vlektifus, maagkoors, geelkoors en malaria. Die afname in gevalle van tuberkulose kan toegeskryf word aan die voorsiening van hospitaal-, sanatorium- en kliniekgeriewe, en aan voorbehoedingsfaktore soos verbeterde voeding, behuising en nywerheidsomstandighede. In die laaste jare het die gebruik van antibiotika en chemoterapie as verdere impetus gedien.

In Suid-Afrika, waar tering veral grootskaals onder die nie-blanke rasse voorkom, was die verbetering traer as in westerse lande oor die algemeen, maar in die laaste tien jaar was daar tog 'n verandering, en was daar 'n bemoedigende afname in die tuberkulosesterftesyfer, nie alleen by blankes nie, maar ook by die nie-blankes by wie dit veel meer dikwels voorkom.[1]

Hospitaalakkommodasie, vir die tweeledige doel van behandeling en afsondering, is 'n noodsaaklike vereiste in die veldtog teen hierdie siekte. Die uiteindelike doel van die nasionale behandelingskema is nie alleen om die siekte te beperk by dié wat reeds lyers is nie, maar ook om die res van die bevolking teen besmetting te beskerm. Vir blankes is daar in Suid-Afrika al amper genoeg beskikbare hospitale en sanatoria, maar dit geld nie vir die groot naturelle- en kleurlingbevolking nie. In 'n poging om vir die tekort aan nie-blanke hospitale te vergoed, word planne gemaak vir die tuisverpleging en kliniekverpleging van aangemelde gevalle, veral deur die gebruik van streptomycin, INH en PAS.

Omdat die Suid-Afrikaanse Nasionale Teringvereniging (SANTV) besef dat die groot struikelblok in die veldtog teen tering die tekort aan beddens vir nieblankes is, bestee hulle 'n groot gedeelte van die fonds waartoe die publiek so vrygewig bygedra het in antwoord op die beroep van 'n paar jaar gelede, aan die voorsiening van inrigtingsakkommodasie vir nie-blanke pasiënte. Dusver het SANTV alreeds amper 2,000 beddens in hul inrigtings verskaf, en 'n verdere paar duisend word beraam. Hierdie neersettings is streng ekonomies ontwerp, en die onkoste aan instandhouding is al verminder tot 'n geringe 7s. 6d. daagliks. Hoofsaaklik berus die betaling van hierdie gelde by die plaaslike owerheid van die pasiënt se tuisdistrik, maar aangesien hierdie uitgawes in aanmerking kom vir 7/8stes terugbetaling deur die Regering, kom die

## EDITORIAL

### INSTITUTIONAL OR DOMICILIARY TREATMENT FOR TUBERCULOSIS?

Recent decades have seen a substantial decline in tuberculosis in most countries of the western world, a decline which arouses the hope that this scourge of humanity is following towards extinction such pestilences as plague, cholera and smallpox, typhus and typhoid, yellow fever and malaria. The fall in tuberculosis is attributable to the provision of hospital, sanatorium and clinic facilities, and preventive factors such as improved nutrition, housing, and industrial conditions. In the last few years an added impetus has been given by the use of antibiotics and chemotherapy.

In South Africa, where tuberculosis is especially rife amongst the non-European races, the improvement was slower than in the western world generally, but in the past decade a change has taken place, and an encouraging reduction has occurred in the mortality from tuberculosis, not only amongst the Whites, but in the far more highly tuberculized non-Europeans.[1]

A prime necessity in the campaign against this disease is hospital accommodation, which serves the double function of treatment and isolation. The long-term object of the national scheme of treatment is not only to arrest the disease in those already affected, but to protect the remainder of the community against infection. For Europeans the available hospitals and sanatoria in South Africa are nearly adequate, but this is far from being the case for the large Native and Coloured population. In an attempt to circumvent the shortage in non-European hospital accommodation schemes are being promoted for the domiciliary or ambulant treatment of notified cases of the disease, especially by the use of streptomycin, INH and PAS.

Recognizing that the shortage of non-European beds is the chief hindrance in the campaign against tuberculosis, the South African National Tuberculosis Association (SANTA) is devoting a large part of the fund which the public so generously donated in response to the appeal of a few years ago, to the provision of institutional accommodation for non-European patients. Already almost 2,000 beds have been provided by SANTA in their settlements and some thousands more are projected. These settlements are designed on 'austerity' lines, and the maintenance cost has been brought down to as little as 7s. 6d. a day. The primary responsibility for the payment of this charge lies with the local authority of the district where the patient lives

werklike uitgawe van die plaaslike owerheid op minder as 1s. 0d. te staan.

SANTV se Nasionale Sekretaris, dr. M. J. Broderick, het onlangs (7 Desember 1955) 'n omsendbrief hieroor aan die mediese beroep gerig. Hy verklaar dat, weens die publisiteit wat ‚lopende' behandeling verwerf het, 'n verkeerde idee posgevat het dat dit nie meer nodig is dat teringlyers in hospitale opgeneem moet word nie. Dit is glad nie die geval nie; die hospitaal is steeds die doeltreffendste bestorming in die geveg teen tuberkulose, en die Regering hou by hulle beleid insake die daarstelling van beddens. Hierdie mening was aangeneem by 'n onlangse vergadering van mediese deskundiges wat SANTV belê het. Afgesien van die onbetwyfelbare feit dat die pasiënt veel beter hoop op beterskap in 'n hospitaal het, is *afsondering* 'n belangrike faktor. Die heeleerste stap wat gedoen moet word wanneer besmetlike tuberkulose uitgeken word, is om die pasiënt in 'n hospitaal te laat opneem; hoofsaaklik om sy kontakte teen besmetting te beskerm—dit kan nie gedoen word as die pasiënt tuisverpleging of die sogenaamde ‚lopende' behandeling kry nie. Laasgenoemde twee wyses van behandeling is van belang wanneer die pasiënt uit die hospitaal ontslaan word, en by gevalle wat op opname in 'n hospitaal wag. Hierdie twee metodes is die tweede verdedigingslinie, toepasbaar as daar nie hospitaalgeriewe is nie, maar die daarstelling van hospitaalbeddens is nog altyd die doeltreffendste wapen in die veldtog teen hierdie siekte.

1. Van die Redaksie (1954): S. Afr. T. Geneesk., **28**. 187

but, as the expenditure ranks for a 7/8ths refund from the Government, the actual cost to the local authority is less than 1s. 0d. a day.

Dr. M. J. Broderick, National Secretary of SANTA, has recently (7 December 1955) circulated a letter to medical practitioners on this subject. He states that owing to the publicity given to ambulatory treatment an erroneous belief has gained ground that it is no longer necessary for tuberculosis patients to be admitted to hospital. Far from this being the case the hospital is still the first line of attack in the battle against tuberculosis, and the policy of the Government in regard to the establishment of beds remains unchanged. This view was accepted at a recent meeting of medical experts convened by SANTA. Apart from the undoubted fact that the patient's chances of recovery are far brighter in hospital, the matter of isolation is an important factor. The first step that ought to be taken when infectious tuberculosis is diagnosed is to remove the patient to hospital; and a primary reason for this is to protect his contacts from infection, which usually cannot be done if he is given only ambulatory or domiciliary treatment. These forms of treatment play an important part after the patient is discharged from hospital and for cases awaiting admission. They are the second line of defence, in the absence of hospital facilities, but the provision of sufficient hospital beds still remains the chief measure in the campaign against the disease.

1. Editorial (1954): S. Afr. Med. J., **28**, 187

## BLOOD TRANSFUSION

In this issue 3 papers are published which were read at the Blood Transfusion Conference held in Cape Town in September 1955 and one read at the South African Medical Congress, Pretoria, in October. Professor M. van den Ende pointed out that all concerned in blood transfusion need special instruction in the subject suitable to the part they have to play, including haematologists, transfusion officers, general practitioners and technicians; and he urged that the director of a transfusion service should have status in the teaching hospital, where he should collaborate with clinicians and pathologists in the teaching of undergraduates and postgraduates.

Dr. A. Zoutendyk spoke of the need for coordination of research in blood transfusion. In this country of vast distances workers at one centre are often ignorant of what is being done elsewhere. There is lack of coordination between workers on different aspects of haematology and immunology. Dr. Zoutendyk suggested that the South African Institute for Medical Research could play an important part in coordination. He advocated that the fractionating of blood products should be centralized at one laboratory in the Union.

Professor R. Turner discussed 'plasma expanders', particularly dextran. He spoke of advantages presented by dextran and added: 'Despite these advantages which dextran preparations possess over blood and blood products, the advantages of the latter as therapeutic agents generally far outweigh those of dextran, so that there is no question of dextran ousting blood, plasma or serum; but, nevertheless, dextran preparations have an important therapeutic role to play which should not be considered as antagonistic to that of blood and blood products but complementary to them. The main use of dextran preparations appears to lie in two sets of circumstances, viz.: (1) when blood, plasma or serum is urgently required in an emergency but is not immediately available, and (2) when supplies of blood, plasma and serum are limited and have to be conserved.'

Professor Turner urged the necessity of economizing blood, especially when, in South Africa, blood obtained exclusively from Europeans is used in the treatment of non-Europeans. Too frequent bleeding of donors should be avoided. 'Plasma expanders', he said, 'must not be ignored by the blood-transfusion services, but their true value should be appreciated and their use controlled, principally through blood-transfusion officers, with the object of making the best use of limited supplies of blood and preventing undue strain on the ever-willing donors'.

Dr. M. Shapiro, in an interesting paper on transfusion in shock and haemorrhage, took the opposite point of view concerning the use if plasma substitutes. Like Professor Turner he held that whole blood was

not always necessary in the immediate replacement of the loss from haemorrhage, but for this purpose he urged the use of plasma and not of plasma substitutes such as dextran, which lacked *inter alia* antibodies, enzymes and clotting factors, and buffering power, and could not perform the nutritive and carrier functions of plasma proteins. Dried plasma was a permanently stable product requiring no refrigeration, and should be available in every hospital ward and operating theatre where it might be needed.

The issue of plasma *versus* plasma substitutes appears to be mainly one of practicability—whether, for instance, with the available blood donors, it is practicable to supply the Native population with the plasma they need, instead of conserving blood supplies by the use of plasma substitutes, under appropriate conditions.

# TEACHING IN BLOOD TRANSFUSION MATTERS*

M. VAN DEN ENDE

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The enormous use of whole blood and 'blood products' in modern treatment has inevitably brought with it problems of which we were previously unaware. The study of these problems has unearthed complexities in the antigenic structure of red cells, in the types of antibodies they elicit and the pathological sequelae of the parenteral introduction of incompatible blood, which a few years ago were not dreamt of.

Already the stage has been reached when not even every haematologist and pathologist is sufficiently familiar with blood transfusion in all its aspects, and certainly it is becoming impossible for the average medical practitioner to have more than a superficial knowledge of the subject. There is however no reason why the average practitioner should be uninformed of the important basic principles involved, why every pathologist should not be fully informed of the essential techniques and their interpretation, and why the fewer experts should not have every facility placed at their disposal to widen their experience, and through their experience to enrich the knowledge of the profession in this important branch of medicine.

As in any branch of medicine it is not sufficient to bring the opportunities for education or training only to a selected few—the *appropriate* opportunity to learn should be given to all.

It must be obvious that the educational facilities are best found within the medical schools, for here the future members of the medical profession are trained. Every undergraduate should be taught the essential principles—so that everyone at least understands not only the undesirability of an immediately harmful incompatible transfusion, but also the undesirability of sensitization to an antigen not present in the individual's own red cells, and knows the simple techniques required to avoid doing harm to the patient through the transfusion of blood.

At the medical schools, too, the postgraduate students can be reached—not only those who are engaged full-time in training for the various specialties, but also doctors in practice for whom facilities for postgraduate study are being provided in the form of refresher courses.

It is important that those responsible for the training of our future doctors should be kept fully informed of all matters pertaining to blood transfusion. Where, as in South Africa, the blood-transfusion services are organized outside the teaching hospitals it is important that the experts in charge of the transfusion services should be given some status within the teaching schools. In collaboration with pathologists and other clinicians of the staff they can help to organize effective transfusion services in the teaching hospitals. The most effective teaching is by example, and to see an efficient transfusion service operating in his teaching hospital will teach the student far more than any number of systematic lectures. But this is not the only reason for suggesting a status in teaching hospitals for technical experts in charge of transfusion services. The advantages are mutual and the transfusion services will benefit greatly from the experience gained by their directors in the teaching hospitals, which are amongst the largest 'consumers' of blood-transfusion products.

Effective teaching cannot be separated from research, but a liaison with the teaching hospitals should not be an excuse for placing the financial burden of research into blood-transfusion matters on the shoulders of the universities. Transfusion services should realize that without research, or 'special investigations' if that term suits the statute book better, a blood-transfusion service, like any branch of medicine, will soon become sterile.

But let me not give the impression that education in blood-transfusion matters can only be undertaken in teaching hospitals. There are aspects which cannot be effectively dealt with at medical schools, such as the organization of donor panels, or those aspects of a transfusion service which are concerned with production rather than use, and which in some services, like that in the Western Province, are administratively separated; and there are the problems connected with the administration of blood by private practitioners.

It is sincerely hoped that we are not going to attempt to lay down separate training programmes for each of the various professional and auxiliary groups concerned with blood transfusion; because blood transfusion cannot, particularly from the educational point of view, be separated from other branches of laboratory and clinical medicine. I will endeavour to list the

* A paper read at the Blood Transfusion Conference, Cape Town, September 1955.

broad principles which in my opinion are fundamentally important. In doing so I will try to avoid discussion of the organizational differences which exist in different centres of the Union—for instance, whether or not separation into donor and technical divisions is desirable. Also we are not concerned here with the domestic affairs of universities and the details of their medical curricula or with the details of technique and equipment which should be adopted.

### CONCLUSIONS

I would list the important principles as follows:

1. The (technical) director of a transfusion service should have status in the teaching hospital. He should collaborate with clinicians on the staff, and particularly the pathologist, in the teaching of 'blood transfusion' to undergraduates and postgraduates. He should act as consultant to the hospital, and should be given access to all cases of transfusion reaction. It might prove in the best interest of the patients, and it would facilitate liaison between hospital staff and transfusion director, if one officer were appointed in charge of all transfusions in the hospital, and there were a panel of trained operators to whom the administration of transfusions was entrusted.

2. Facilities should be provided for the postgraduate training of general practitioners in transfusion matters. This can probably best be done in medical schools, where existing postgraduate educational facilities can be utilized. Training programmes for general practitioners should also be arranged at non-teaching hospitals by the transfusion services.

3. The need for special instruction of selected practitioners in the administration of blood should be considered, i.e. the establishment of panels of transfusion officers. This is, however, less an educational problem than an administrative and 'medical political' one, in which bodies such as the Medical Association are involved.

4. The training of technicians is, in my opinion, best carried out in collaboration with pathological laboratories, whether governmental, provincial or university, so that the technicians receive training and experience in general laboratory techniques as well as in the specialized techniques required in a transfusion service.

5. The standardization of techniques will from the educational point of view be an advantage. It is, however, my opinion that minimum technical standards should be laid down by statute and that, beyond these, individual laboratories should be allowed to develop their own methods. Provided the principles underlying the methods adopted are adequately taught, there will be no need to lay down exact details of a wide range of techniques.

6. Whilst it is necessary to legislate for the minimum requirements to which equipment should conform, it appears unnecessary, from the educational point of view, to lay down exact details beyond this. Instruction of medical and technical personnel should however include an explanation of the principles on which the minimum requirements are based.

## COORDINATION OF RESEARCH INTO BLOOD TRANSFUSION PROBLEMS*

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Blood transfusion as a major branch of medicine is largely a post-war development in South Africa. In common with most other specialized and rapidly expanding subjects it has suffered from a serious dearth of experienced and well trained workers both professional and technical, this applying particularly to serologists. Research has therefore been carried out under considerable difficulties, and it is gratifying that so much original work of a high and internationally recognized standard has been carried out by a few enthusiasts in addition to their ordinary duties. With the advent of more settled conditions and the establishment of blood-transfusion services throughout the Union one feels that the time has come for a cooperative effort to place research into blood-transfusion problems on a planned and national basis.

### *Scope for Research*

The unlimited scope and urgent need for research into blood-transfusion problems cannot be sufficiently stressed. Lest the outlook become too narrow and the researches of many workers in allied fields be lost or diverted into other channels it would, perhaps, be advisable to consider the transfusion aspect as merely incidental, as indeed it is. The field for research is largely immunological and should thus include almost everyone working on blood, or rather that new branch known as immuno-haematology. One thinks immediately of the haemolytic anaemias, auto-antibodies, sickling, transfusion reactions, anthropology, genetics and a host of other problems on which research is being carried out in South Africa at the present time and all of which have some bearing either direct or indirect on the collection, storage and safe administration of blood.

### *Lack of Liaison*

One of the main handicaps to research in this country of great distances and small scattered populations is the lack of opportunity for first-hand interchange of ideas and the consequent ignorance of what research is taking place in other centres at any given time. We in Johannesburg, for example, usually have no idea of

* A paper read at the Blood Transfusion Conference, Cape Town, September 1955.

what work is taking place in our own field in other parts of the Union; it seems almost incredible that on a number of occasions one has received the first news of a research project in Cape Town and Durban from colleagues in London or New York. Every effort should now be made to remedy this state of affairs if duplication of effort and dispersal of our already limited research-resources are to be avoided. It is for this Conference to explore the possible ways in which this may be brought about; as a basis for the discussion I think this is an opportune moment to place on record the contribution which we at the South African Institute for Medical Research are able and anxious to make.

As the pioneers of blood-transfusion and blood-group research in Southern Africa, the Institute is in a privileged position to coordinate, advise on and participate in similar lines of research elsewhere. Apart from its blood-group research and transfusion laboratories, there are so many facets to the Institute's activities that it is difficult to envisage any piece of research undertaken in smaller centres in which the large professional and technical staff of the Institute could not afford some essential service. By placing the vast resources of the Institute at the disposal of every transfusion service in the Union, and even beyond its borders—and we take this opportunity of offering to do so—we feel that a big step will have been taken towards ensuring that closer scientific contact which has been so lacking in the past. This applies not only to organizations but also to individual practitioners who may encounter transfusional or other haematological problems in their practices. It is not generally appreciated that the patient is the source of all research material and the practitioner is thus an essential link in the research chain; the very large number of specimens for diagnosis received by the Institute each day is not dull routine but an invaluable sorting room for research material. We have also always felt that one of our most important functions is the training of young professional and technical staff, many of whom would ultimately be absorbed by other centres. This in time will result not only in closer liaison but will also tend to bring about some measure of standardization of techniques and equipment which is very desirable in blood-transfusion work.

### SPECIALIZED BLOOD-TRANSFUSION LABORATORY-PROCEDURES

*Blood Products.* It would be quite uneconomic and almost impossible for a number of centres in the Union to embark on the fractionation of human plasma. The only practical solution would appear to be centralization on the lines recently adopted in Britain, where plasma from all the branches of the National Transfusion Service in England and Wales is sent to the central plant in Elstree for processing, drying or fractionation.

The first human gamma globulin prepared in the Union was produced at the Institute in 1950, and since that time all demands have been met for measles and poliomyelitis prophylaxis. There has, however, been an insistent and growing demand for other fractions such as fibrinogen, fibrin foam and albumin, and if these are to be produced in sufficient quantities to meet the Union's demands an elaborate and expensive organization must be set up which will permit of the fractionation of plasma on a large scale by either the Cohn (alcohol) or Kekwick (ether) methods. The Institute, through its blood-group-research laboratories would be prepared to undertake this work if it could be assured of a regular supply of plasma from the other transfusion centres. The financial aspects could no doubt be agreed upon and the contributing centres would be assured of a regular supply of plasma fractions; some of the smaller services who do not carry out their own technical work might prefer to receive a portion of their quota in the form of serum ready for administration to patients. This plan, if adopted, would eliminate waste, reduce costs and ensure a regular and adequate supply of gamma globulin and other plasma fractions at an economic price throughout the country. At present, apart from gamma globulin, the Union is dependent on American sources for plasma fractions, the cost of which is extremely high; imported fibrinogen, for example, costs over £9 per gram. To illustrate how essential the scientific and technical resources of the Institute are to a project of this nature I may mention that in the production of blood and blood products we require the cooperation of 5 other departments, viz. serology (syphilis), parasitology (malaria), biochemistry (electrophoresis), viruses (poliomyelitis titrations) and therapeutic serum (diphtheria-antitoxin titrations). I am not aware of a transfusion centre anywhere in the world which has the advantage of all these facilities virtually under one roof.

The blood-transfusion services of the Union are now at an important stage in their development and we feel that we have much to offer as a reference laboratory, a training centre and a production unit for plasma fractions and diagnostic sera. The proposals made should in no wise be considered to imply one-way research traffic into blood-transfusion problems. Although we have much to offer we shall also need much in the way of active cooperation and interchange of ideas and material if the practice of blood transfusion in South Africa is to keep pace with the tremendously rapid advances now being made throughout the world.

## NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

*Entacyl Suspension.* The British Drug Houses announce that they now have available a single-dose container for the one-day treatment of ascariasis.

Each bottle contains 28 ml. of Entacyl Suspension sufficient for the treatment of ascariasis in one adult or several children. This packing is ideally suited for the mass treatment of affected communities as recommended by Drs. Hanna and Shehata in Brit. Med. J., 13 August 1955 (**2**, 417).

The recommended dose is 750 mg. of piperazine adipate (4·4 ml.) per year of life up to 6 years and 4·5 g. of piperazine adipate (26·6 ml.) from 6 years upwards to be given on one day in 4 equal parts at 4-hourly intervals after meals.

Apart from the economy in general usage it is felt that this packing will appeal to those doctors who are faced with the problem of eradication of ascariasis in a large number of patients whose attendances for treatment are unreliable.

# TRANSFUSION IN SHOCK AND HAEMORRHAGE *

MAURICE SHAPIRO

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In this paper no attempt will be made to review the many fascinating researches on the pathology of shock or to examine the numerous and complex disturbances of physiological mechanisms which may follow haemorrhage or severe injury to the body, with or without external loss of blood. Suffice it to say that to the experienced practitioner the state of shock is unmistakable, only the most cursory examination being usually required to indicate the necessity for urgent resuscitative treatment.

With eyes glistening, pupils dilated, face deathly pale and hands and feet icy cold, the patient looks and generally feels as if he is dying, as indeed he may be. He may be restless and apprehensive; or he may be still and apathetic. Sensibility for pain may be markedly reduced and, unless this can be attributed to the prior administration of a sedative, it should be considered a very serious symptom indeed. The pulse may be moderately fast or it may be slow; its volume is generally perceptibly reduced and the systolic pressure may be 90 mm. or less. In the terminal stages of circulatory failure tachycardia and extreme hypotension are constantly found.

The catastrophe which has precipitated this alarming state may be immediately apparent, as in severe accidental injury, external haemorrhage, burns, or electrocution; but an essentially similar condition is found in coronary or pulmonary embolism, acute intestinal obstruction and internal haemorrhage. Irrespective of the cause, the fundamental disturbance in all cases of severe shock is a reduction of the effective circulating blood volume. A satisfactory state of the circulation depends essentially on 3 factors: the force, regularity and rate of the heart beat, the volume and viscosity of blood entering the arterial tree, and the state of contraction of the arterioles. Any severe disturbance of one or more of these 3 factors leads to a condition in which the volume and rapidity of the arterial circulation is profoundly reduced.

In haemorrhage, the state of shock generally varies in proportion to the blood loss. But the rapidity of the bleeding is an important factor. Thus a patient may tolerate the loss of 3 or even 4 pints over a period of several days without necessarily showing any marked symptoms other than weakness and pallor, whereas in acute haemorrhage the loss of 2 pints or more is inevitably followed by some degree of shock.

The total circulating blood volume is approximately 40 c.c. per lb. of body weight. Thus an adult weighing 150 lb. has a blood volume of approximately 6 litres and the loss of 1 litre therefore represents a reduction of about 16%. This usually causes shock of moderate degree. With the rapid loss of 2 litres of blood, shock is invariably profound. However, the state of shock rather than the assessed blood loss should be the determining factor in computing the volume of blood or other fluid which should be immediately transfused.

In some cases, such as bleeding peptic ulcer, ruptured liver, or crush injury of the chest, thigh or pelvis, the patient may literally bleed to death into his tissues, viscera or serous cavities. In crush injuries there is usually marked serous effusion (in addition to whole blood extravasated into the muscles and tissue spaces), which further aggravates the reduction in circulating blood volume.

## TREATMENT OF SHOCK

The treatment *par excellence* in all cases of shock due to haemorrhage is the immediate replenishment of the circulating blood volume. The administration of stimulants and vaso-constrictor drugs is likely to be followed by only evanescent results and may do little to rectify the essential pathology of the condition. Although, *prima facie*, whole blood would appear to be the transfusion fluid of choice, there are several cogent reasons dictating a different course as an initial step. Severe haemorrhage is always an emergency and the preparation for transfusion in these cases always a matter of extreme haste. But the hazards of whole-blood transfusion are numerous and these reside mostly in the red cells.

At this point, I wish to emphasize that when whole blood is employed, it is not essential to transfuse with blood of homologous group. The important side of the cross-matching test is the major side, i.e. the reaction of the patient's serum with the donor's cells. Since group-O cells contain no A or B agglutinogens, they can be infused without risk into patients of any group.

The safety with which the plasma of low-titred group-O blood can be administered to recipients of other blood groups is probably due to the fact that the normal (bivalent) iso-agglutinins are readily neutralized by the corresponding blood-group substances which are present in abundance in the body tissues and fluids of group A, B and AB recipients. Immune (univalent) iso-antibodies and haemolysins are not inactivated in this way and these may cause progressive and severe destruction of an incompatible recipient's blood cells. Only a small minority of group-O bloods contain immune iso-agglutinins but, since their presence is almost invariably accompanied by a high titre of normal iso-agglutinins, they can readily be eliminated by preliminary screening for iso-agglutinin titre. Haemolysins are tested for directly by incubating the fresh plasma with A and B cells. All bloods showing haemolytic activity or excessive titre of iso-agglutinins are labelled 'High Titre' in our laboratories and must be used exclusively for recipients of the same blood group. 'Low Titre' group-O blood can safely be used for recipients of any blood group.

* A paper presented at the South African Medical Congress, Pretoria, October 1955.

Because of the risks of faulty grouping and cross-matching by those unaccustomed to the performance of these tests, we permit the storage of no other than low-titred group-O blood in all divisions and branches of our Service except those where full-time trained technicians are available. It is interesting that the American military authorities are now agreed that, in the event of a national emergency, only group-O blood should be transfused.[1] This was their routine practice in the Korean war and no dangerous reactions were observed even when massive transfusions were given to group-A and group-B recipients.[2]

A hazard which is not so easily disposed of is that which may result from Rh incompatibility. The routine use of group-O Rh-negative blood is impracticable for the reason that only 13–15% of all group-O White donors are of this type, i.e. just over 5% of the entire donor population. Obviously, these few cannot supply the needs of all the patients. The indiscriminate use of group-O Rh-negative blood in order to play safe is therefore to be deplored, since it can only result in the deprivation of compatible blood for those for whom it is reserved, i.e. Rh-negative patients, 50% of whom will inevitably be sensitized to this factor after a single Rh-positive transfusion. In those who have previously been subjected to the same risk by earlier transfusion the results may be disastrous. The long-term effects of Rh sensitization in females, who may be permanently prejudiced with regard to future pregnancies, is too well known to require further emphasis.

But even if the Rh type of donor and patient are both known, there still remains the risk of incompatibility due to some of the newer blood-group factors such as Kell, Duffy, Kidd etc. which, though rare, have on occasions caused severe and even fatal reactions.

As a minimum, a direct compatibility test between the serum of the patient and a cell suspension of the donor must always be performed. This will at least detect gross incompatibility due to blood wrongly labelled group O. In addition, it is desirable, wherever possible, to perform an antiglobulin test on the mixture of donor cells and recipient serum. This sensitive test will detect nearly all incompatibilities due to Rh and other blood-group antigens. However, if this test is to be done properly, the cell suspension of the donor must be permitted first to react with the recipient's serum for at least 30-45 minutes at 37°C. An hour or more may therefore elapse before the blood can be cleared as properly compatible for transfusion.

It is a popular fallacy that where blood is lost, only replacement with whole blood is effective. The essential feature in haemorrhage is loss of circulating volume; and it is the volume, not the red-cell mass, which requires urgent replenishment. In shock without extravascular blood loss, it is again the restoration of effective blood volume which is required, since the circulation is diminished owing to widespread arteriolar and capillary dilatation. It is only in this type of shock that vaso-constrictor drugs play an important role. The loss of as much as 40% of blood volume from haemorrhage means that 60% of red cells are still retained in the circulation. We are all familiar with the fact that a haemoglobin level of 60% is not immediately or even remotely dangerous to life. Therefore, replenishment of the blood volume alone, without addition of red cells, should suffice. The question is then: what choice have we, other than whole blood? The obvious choice is human plasma.

## PLASMA *versus* PLASMA SUBSTITUTES

In recent years, an opinion has arisen against the use of plasma and in favour of so-called plasma substitutes. There are two main reasons for this: firstly, until recently, plasma has mostly been prepared in large pools, sometimes from several hundred donors. This has led to a high incidence of serum hepatitis, since the plasma of only one donor harbouring the virus may be sufficient to contaminate an entire pool. During the Korean war, when it was presumed that the magic wave-length of ultra-violet irradiation would effectively intercept and destroy all viruses, the use of large-pool irradiated plasma resulted in no less than 20% of all recipients being stricken with hepatitis.

Acting on the assumption that the transfusion needs of the public in peacetime could not be adequately met by public donations of blood for plasma, large-scale production of plasma substitutes—dextran, polyvinyl-pyrrolidone and gelatin—was intensified after the second world war. At least so far as South Africa is concerned, these gloomy predictions have proved to be unwarranted. Moreover, avoidance of pooling and the individual bacteriological control of each unit has eliminated the risks from toxic products of bacterial contamination and has reduced the risk of virus infection to a point where it can be no greater and is probably less than with transfusion of whole blood.[3]

Since dried plasma is a permanently stable product and requires no refrigeration, it should be available in every hospital ward and operating theatre where it may be required.

And what of the plasma substitutes or 'expanders' as they are more correctly named? By definition, the ideal plasma substitute should possess all the attributes of plasma itself. However, none of these substances can be regarded in this sense. As Squire and co-authors[4] emphasize in the opening paragraph of their recent book on Dextran: 'They all lack, among other things, antibodies, enzymes and clotting factors, possess only slight buffering power and, with the possible exception of gelatin, do not contain protein and therefore cannot perform the nutritive and carrier functions of normal plasma proteins'. It may be mentioned in addition that some of these substances are antigenic in man, and there is evidence that some of them may be retained for years in the liver and other organs. Ogilvie[5] writes on this question as follows: 'What is their place in the treatment of shock? The answer is in the 7th chapter of Matthew's Gospel: 'What man is there of you who if his son ask bread will give him a stone?'.

## A SCHEME OF TRANSFUSIONS

A rational scheme of transfusion treatment of severe shock is therefore as follows: Assuming that a replace-

ment of 4 pints is indicated, run in 2 pints (i.e. 4 units) of plasma rapidly, under pressure if necessary. If, after this, the blood pressure is still low, follow with citrated whole blood of compatible group and correct Rh type if available; otherwise continue with plasma. The residual anaemia can always be corrected at leisure by transfusion of whole blood if necessary.

In massive uncontrolled haemorrhage, it may be necessary to dispense with the careful incubated compatibility tests and to proceed immediately with the transfusion of group-O blood of correct Rh type. Cases are on record where it has been necessary to transfuse as much as 30 pints of group-O blood within a few hours in order to bring the bleeding under control and correct the shock.

*Intra-arterial Transfusion*

In desperate conditions of shock, and particularly in those where there has been delay in instituting resuscitative treatment and who are therefore threatening to pass into irreversible shock, transfusion by the intravenous route may prove ineffective or may even aggravate the patient's condition. In these cases, the condition of the heart muscle may already have deteriorated to such an extent, owing to prolonged anoxia, that it may fail to respond adequately, with resultant venous congestion and failure. In such cases, a dramatic response may frequently be obtained by intra-arterial transfusion.

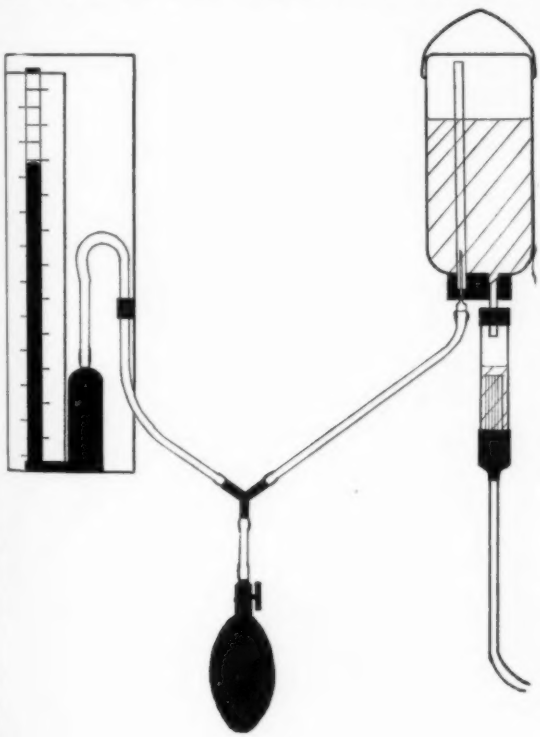

Fig. 1

Desperate situations warrant desperate remedies and in such cases it is permissible to take the risk of subsequent loss of a digit from gangrene, which occasionally follows if the radial artery at the wrist is employed for the purpose.

The pressure in the bottle should be maintained at between 140 and 180 mm. of mercury and the needle introduced into the artery should be of fairly wide bore—say 15 SWG. On no account should a gas cylinder be used as the source of pressure, whether for intravenous or for intra-arterial transfusions, since the great danger in all pressure transfusions is air embolism. A simple and safe apparatus for pressure transfusion is illustrated in the diagram (Fig. 1). It can be rapidly assembled in any emergency out of a sphygmomanometer gauge and bulb, the Y-piece with attached tubing from an ordinary stethoscope, and a hypodermic needle. With this apparatus, the pressure in the bottle can be accurately controlled during the transfusion and instaneously released when the level of the blood in the bottle nears the emptying point.

The immediate response to intra-arterial transfusion is probably due to the fact that the increased intra-arterial pressure causes the aortic valves to be shut tight; the coronary arteries then become forcibly dilated with oxygenated blood from the aorta and subclavian vessels. This is displaced towards the heart by retrograde filling from the transfusion site and the improved coronary blood supply results in stimulation of the flagging heart muscle. As soon as distinct improvement in the circulatory condition has been established, the transfusion should be switched to the intravenous route. In massive coronary or pulmonary embolism, intra-arterial transfusion may, on occasions, revive a moribund patient. It is also of great value in sudden cardiac or respiratory collapse during anaesthesia, and in these cases the blood may be transfused by insertion of the needle into any large artery exposed at the site of operation.

*Transfusion in Operation and Childbirth*

Since shock during or following operation is always a potential risk, pre-operative transfusion should be given prophylactically in those cases which show evidence of diminished blood volume. If blood loss is at all severe during operation it should be replaced. The possibility of transfusion being required during operation is one which should always be anticipated and compatible blood should be cross-matched in advance. That there should be a panic rush for blood during an elective operative procedure is in most cases quite inexcusable.

In all major centres in South Africa, and even in many village hospitals, the availability of abundant supplies of blood and plasma has largely come to be taken for granted. In most of our maternity and general hospitals death from shock or haemorrhage has rightly come to be looked upon as a rare and avoidable calamity. While we, as doctors, may take pride in the dramatic rescue of many patients, poised on the brink of death, it is well that we should remember the thousands of voluntary blood donors who have made these things

possible, and we should applaud and encourage their efforts.

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# A 'LIVELY' BRACE FOR THE TREATMENT OF SCOLIOSIS

## PRELIMINARY COMMUNICATION

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The mechanics of correction of scoliosis by means of active bracing are resolved broadly into 3 groups.

1. The 3-point pressure method, or some variant of it such as the Barr-Buschenfeldt brace,[1] or in combination with an active distracting force such as utilized by the Milwaukee brace.[2]

2. Longitudinal traction and derotation, as in the Galeazzi method,[3] in which the scoliosis is derotated on a specially designed table while traction is simultaneously applied, the correction being maintained by progressive plaster-of-paris casts.

3. A hinged type of brace containing an adjustable turnbuckle such as in the Risser jacket.[4]

The common characteristic of all these braces is their rigidity and consequently the inelastic forces to which the patient is submitted. In these braces the corrective forces are increased by turnbuckle and screw, which are progressively tightened as the curve under treatment accommodates itself to its new position, thus sacrificing spinal mobility for unyielding correction.

The brace to be described depends for its corrective effect upon the dynamics of a compressed helical spring; that is to say, a vertical coil-spring that has been subjected to compression and to a winding-up effect, so that when the spring is released there occurs opposite directional rotation of the ends of the spring combined with an increase in the length of the helix or coil. The appliance can thus be termed a 'lively' brace, since the forces acting on the patient, while dynamic in character, are also of a resilient and elastic nature.

The brace consists of a pelvic and a thoracic corset, each of which laces up anteriorly. These corsets are linked posteriorly and in the mid-line by a helical spring through the centre of which runs a cylindrical

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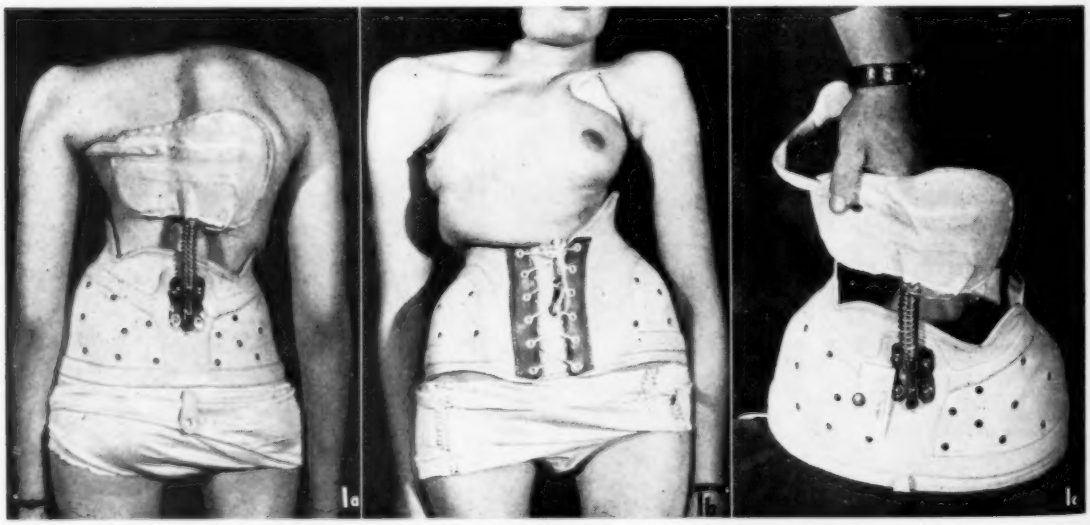

*Fig.* 1. (*a*) Posterior View. The first brace to be constructed, motivated by a single helical spring. 2½ inch of lift was achieved without the use of a full thoracic corset. The patient, who suffered from a paralytic scoliosis, had worn various types of brace since the age of 6, stated that this was the most effective and comfortable appliance in her experience. (*b*) Anterior view. (*c*) Brace with spring compressed and wound up.

steel rod; the purpose of which is to stabilize the spring in its longitudinal axis and to limit its longitudinal excursion, thus forming a rigid core about which the spring may rotate and lengthen (Figs. 1 and 2). The spring is so constructed that its upper and lower ends, when motivated, can effect a suitable torsional and longitudinal thrust upon the thoracic and pelvic corsets respectively. When the spring is wound up, because of the stability of the pelvic portion of the brace the full mechanical effect is thrust upon the thoracic corset and the effect is found to be twofold:

1. The spring attempts to unwind, thus exerting a derotational thrust upon the thoracic corset.
2. As the spring unwinds it increases in length and a distracting force is exerted upon the thoraco-lumbar segment of the spine.

The scoliosis is thus subjected to the resultant of the corrective forces of derotation and distraction.

The necessity for a lateral corrective thrust upon the apex of the scoliotic curve, with its attendant disadvantages, is thus obviated; the corrective force being solely an upward torsional and dynamic lift which takes its purchase upon the firm foundation of the pelvic corset. Attached to the thoracic corset, posteriorly and on either side of the spring, are two leather straps which contain eye-holes at their lower ends. When the thoracic and pelvic corsets are 'set' so that they lie in the same neutral but 'wound-up' position, the straps are attached to conveniently placed studs in similar position on the pelvic corset. The brace is now 'loaded' and ready for use.

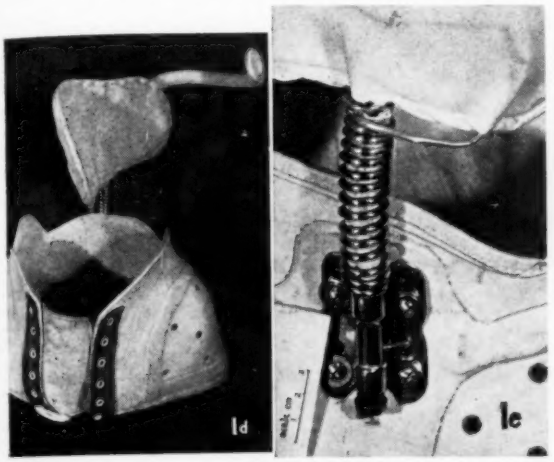


*Fig.* 1. (*d*) View of brace with spring released. (*e*) Detail of spring and mounting.

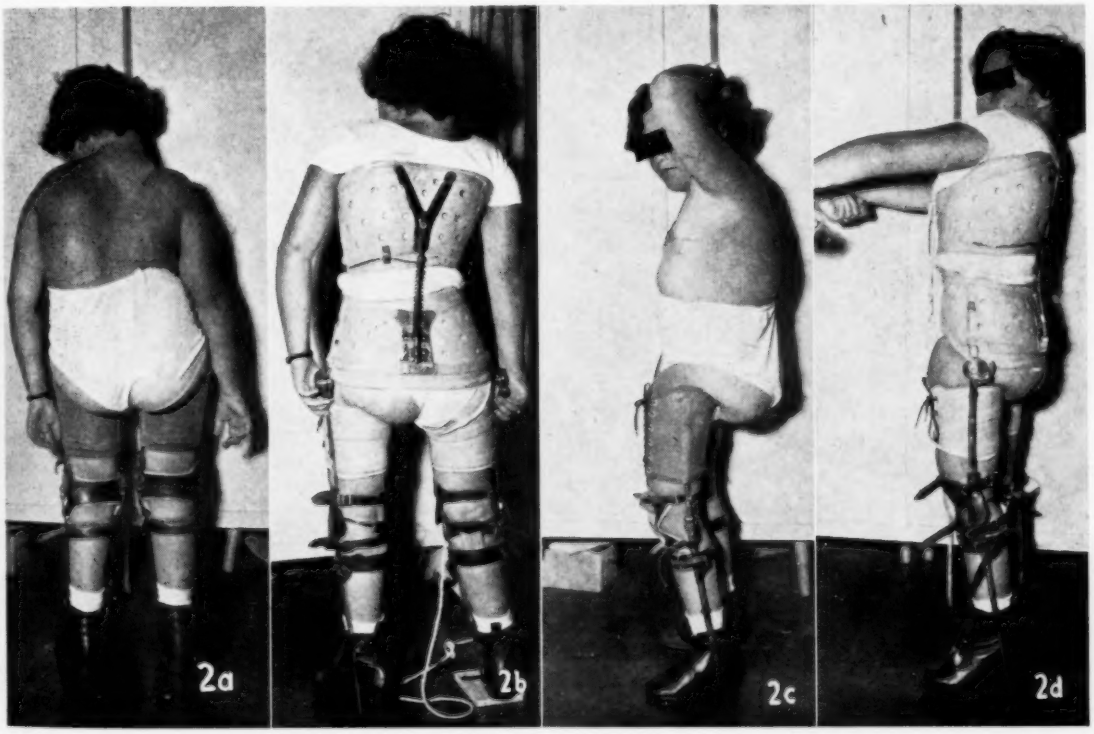


*Fig.* 2. (*a*) Paralytic scoliosis. Patient had abandoned 3 point pressure type appliance because of discomfort. (*b*) Posterior view. Early brace with single helical spring. Brace has long leg calipers incorporated with pelvic corset. Helfet hip springs[6] have been fitted. (*c*) Lateral view without brace. (*d*) Lateral view with brace.

When the patient has put on the brace and the two corsets have been securely laced, the straps are released and the wound-up spring produces its derotational and distracting effect.

The design of the brace permits the patient considerable rotational mobility, while antero-posterior and lateral movement of the spine are effectively limited. If the patient suffers from a right dorsal scoliosis, attempts at rotation of the shoulder girdle, in relation to a fixed pelvis, have the following sequence:

1. Rotation so that the right shoulder points posteriorly. The spring is wound-up by this action and thrusts the shoulder and thorax back into a corrected and derotated position.

2. Rotation so that the left shoulder points posteriorly. This action is a corrective one and is therefore encouraged by the torsional thrust of the spring.

It has been found that the use of two separate springs, the one for its extension effect alone and the other for its rotational effect, while conforming to the principle of

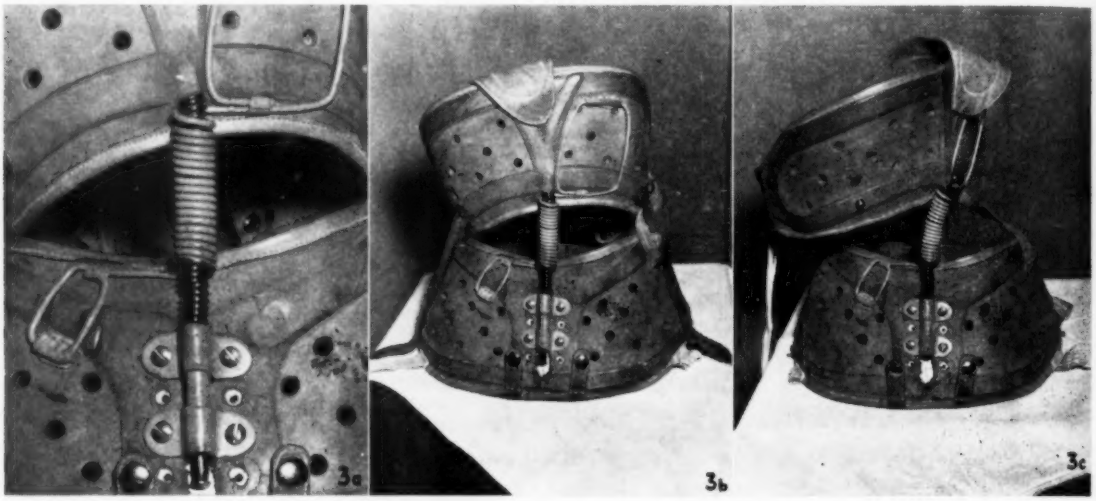


*Fig.* 3. (*a*) Detail. Improved type of brace showing double spring action. Rotation spring (light). Extention spring (dark) (*b*) Posterior view. Brace showing strap 'loading' mechanism. Brace now ready for wear. (*c*) Brace with loading straps removed. Extension and rotation springs operating at full effect.

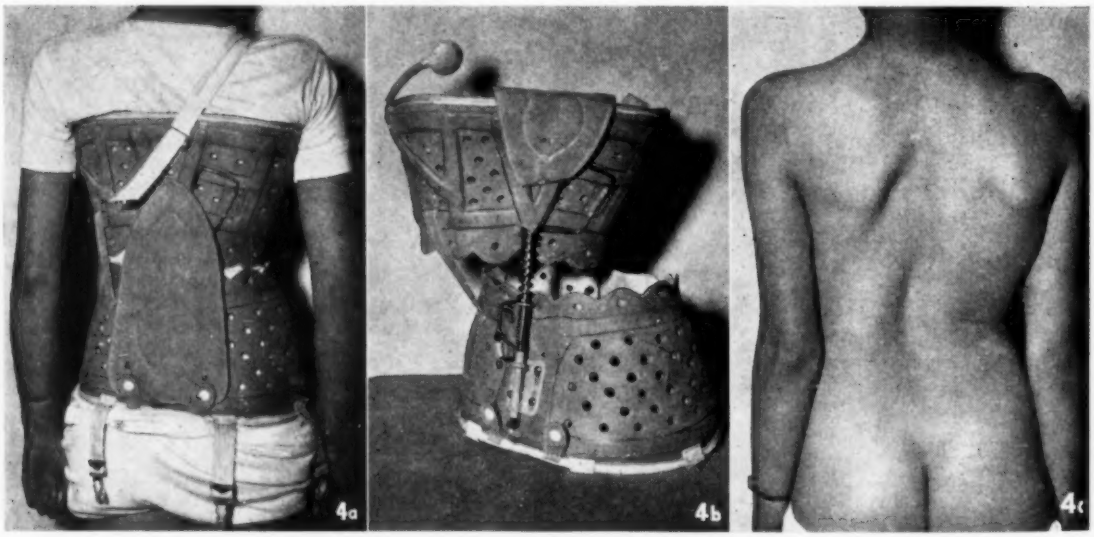


*Fig.* 4. (*a*) Posterior view with protective flap. (*b*) Posterior view. Showing double spring brace with rotation spring above and extension spring below. The stout elastic band connecting the left side of the thoracic corset to the left side of the pelvic corset prevents the springs from unwinding completely. (*c*) Postural scoliosis.

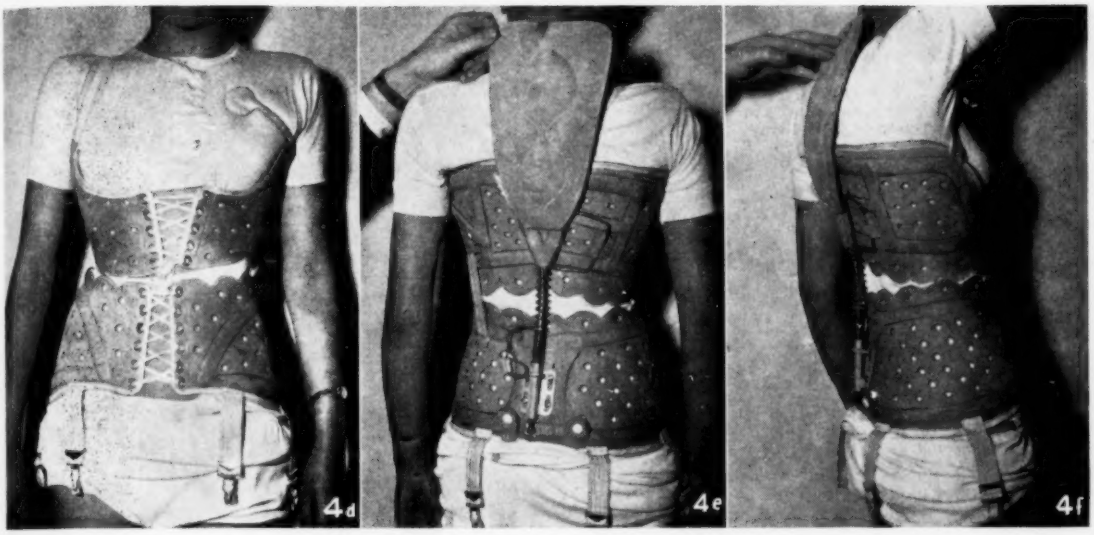

*Fig.* 4. (*d*) Anterior view. The pectoral pad and shoulder strap are not inherent to the brace. (*e*) Posterior view with protective flap raised. In this brace the extension spring lies below the rotation spring. (*f*) Lateral view.

the single helical spring, permit an elasticity of prescription which is not possible with a single spring. By the use of two springs, the power of extension or rotation may be varied at will (Figs. 3 and 4). This brace has been used successfully by Mr. Helfet[6] as a post-operative procedure following internal stabilization of the scoliotic spine. The brace is prepared from a corrected cast of the patient and is fitted in the theatre on completion of operation.

The principle of the torsional force produced by a wound-up helical spring has been further uitlized by the author for the correction of (1) spasmodic torticollis, (2) club feet, and (3) flat feet. Separate papers describing these appliances are in preparation.

I wish to thank Mr. A. J. Helfet for his encouragement and valued cooperation and Professor C. Allen for permission to publish this paper. The braces were constructed for me by Mr. L. Krumbock of A. H. Hodges & Co., 50 Strand Street, Cape Town, whose ingenuity and patience I gladly acknowledge. Mr. B. T. A. Todt took the photographs.

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# SICKLE-CELL ANAEMIA IN A YOUNG COLOURED ADULT MALE

## REPORT OF A CASE

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Only 3 cases of sickle-cell anaemia have been reported from South Africa. In this paper a 4th case is presented, in which the diagnosis has been established by special physicochemical studies of the haemoglobin.

### CASE REPORT

A Eurafrican male, aged 24 years, was admitted to Baragwanath Hospital on 2 May 1955, complaining of severe pain in the left hypochondrium for the previous 3 days. The pain was aggravated by deep inspiration and radiated into the left loin and the left shoulder. During the preceding 3 years he had experienced several attacks of pain in the knee, ankle and wrist joints lasting for a few days to a week. There was no history of swelling of the joints, fever, jaundice or ulceration of the legs.

*Family History.* His father was apparently a pure Indian, born in Bombay, who had died at an early age from 'a leaking valve'. On the maternal side his grandmother was Scottish and his grandfather of mixed Indian and Coloured blood. His mother

had died at an early age from pulmonary tuberculosis. The patient was one of 8 siblings, all of whom were alive and well, and he was the father of 3 young healthy children.

*Physical Examination.* A well developed adult male in obvious pain. Temperature 99°F, pulse rate 108 per minute, blood pressure 138/78 mm. Hg. The spleen was enlarged 3 cm. below the costal margin and was markedly tender on palpation. The sclerae were slightly icteric. No obvious anaemia. No abnormality of the joints. The heart was not enlarged and no murmurs were heard. Remainder of physical examination negative.

*Special Investigations*

1. The urine contained an excess of urobilin, and the serum-bilirubin level was 1·3 mg.%.

2. A full blood-count revealed moderate anaemia and reticulocytosis—haemoglobin 10·5 g.%, leucocytes 10,000 per c.mm.

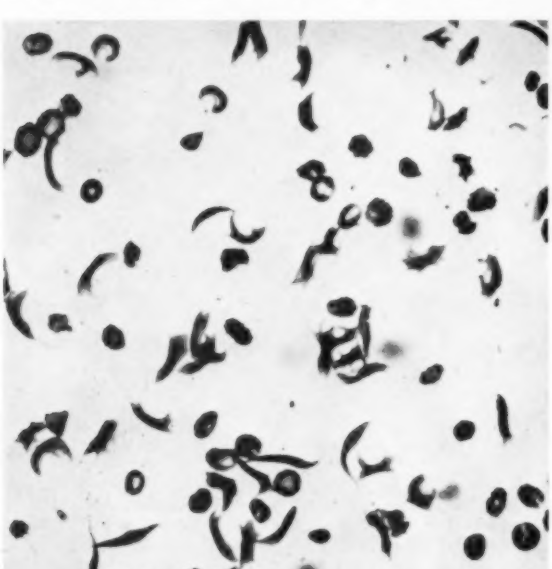

*Fig.* 1. Blood film after 24 hours of anaerobic incubation showing marked sickling (X 600).

(neutrophils 60%, monocytes 6%, lymphocytes 31%, eosinophils 3%) PCV 37%, MCHC 30%, reticulocytes 6%, ESR (Wintrobe) 3 mm./hour. The red cells showed diffuse polychromasia but no abnormality of shape or size.

3. After 24 hours of anaerobic incubation the red cells exhibited marked sickling (Fig. 1). The cells showed reduced fragility, haemolysis commenced at 0·45% saline and was complete at 0·1%.

4. Haemoglobin studies gave the following results:

(*a*) Paper electrophoresis showed that all the haemoglobin present was sickle haemoglobin.

(*b*) The haemoglobin was less soluble in phosphate buffer solutions than normal haemoglobin (0·8 g. per litre in 2·24 molar buffer compared with the normal—at least 5 g. per litre).

(*c*) Of the haemoglobin 23% was resistant to denaturation by alkalis, as compared with the figure of 2% for normal haemoglobin.

5. Radiological examination of the skeletal system showed cysts in the small bones of the hand and in the tibiae, changes

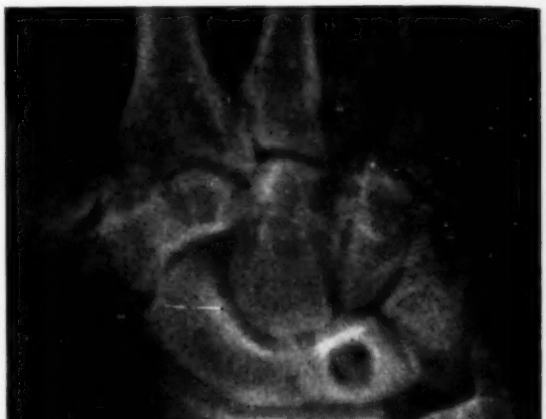

*Fig.* 2. Radiograph of right hand showing cystic changes in the carpal bones.

which have been previously described in the haemolytic anaemias (Fig. 2).[1,2] No abnormality was found in the other bones. The heart and lung fields were examined and found normal, although others have reported cardiac enlargement.[3]

6. Blood studies were made on the available members of the patient's family. Sickling was found in the blood of one of his sisters and one of his children, aged 3 years. In these 2 subjects further investigation by paper electrophoresis, solubility and alkali resistance showed that the haemoglobin consisted of equal parts of sickle and adult varieties. The findings indicate that the subjects possess the trait but are not suffering from sickle-cell anaemia.

*Progress*

For the first week of his stay in hospital the patient complained of pain in his knees, ankles and wrists. His temperature subsided after 24 hours. He lost his splenic pain and tenderness after a few days, but the spleen did not recede in size. Examination of the blood 2 weeks after admission showed improvement: haemoglobin 14 g.%, reticulocytes 1·5%, serum bilirubin 0·7 mg.%. He was discharged symptom-free on 25 May 1955.

He was readmitted to hospital 1 month later with recurrence of pain and tenderness over the spleen. There was no evidence of fresh haemolysis on this occasion. As suggested by Bauer[4] and Klinefelter[5] oxygen was administered but without apparent effect on his symptoms.

## DISCUSSION

The diagnosis of sickle-cell anaemia in this case was confirmed by finding that the haemoglobin consisted entirely of the characteristic abnormal sickle-haemoglobin. In 1949 Pauling *et al.*[6] showed that sickling was due to the presence of an abnormal haemoglobin, which is now known as haemoglobin S. Patients with sickle-cell anaemia have almost all their haemoglobin in the S form, while those with the sickle-cell trait have a mixture of normal adult and S haemoglobin.

The disease usually begins in childhood and it is unusual for symptoms to start in adult life, as occurred in the present case. The condition has, however, presented with its first symptoms in a patient 78 years

old.[7] The prognosis is poor and patients seldom live beyond middle age.

The treatment of the condition is symptomatic. Inhalation of oxygen has been recommended for haemolytic crises,[4,5] and transfusion of blood may be necessary. Anticoagulants have been tried, without effect.[8] Splenectomy has been performed in cases with severe abdominal pain or gross splenomegaly, but the results have not been striking and sickling is unaffected by the operation.[9,10]

Both the sickle-cell trait and the anaemia are rarely encountered in South Africa. Amongst the Bantu, Altmann[11] found one example of the trait in 403 soldiers and Griffiths[12] found 2 amongst 600 hospital patients; amongst the Cape Coloured Esrachowitz *et al.*[13] found 9 instances in 1,555 subjects examined. On the other hand, the trait is common amongst black races in Northern Rhodesia, Central Africa and India, as well as other parts of the world. Among many African tribes 20-40% of the total population are affected[14,15] and in Southern India the incidence of sickling in certain aboriginal communities ranges from 8 to 30%.[16]

Only 3 cases of sickle-cell anaemia have been reported in South Africa. Of these one occurred in a European;[17] of the other 2 patients one was an Indian woman born in South Africa[18] and the other a young girl of mixed Xosa and Liberian parentage.[19] As in the case now reported, parents of both these non-European cases originally came from areas where the trait is commonly found, namely India and Central Africa. It is therefore possible that in South Africa the disease is only seen, amongst non-Europeans, in persons whose parents have carried the trait from an area where it is more prevalent.

SUMMARY

(1) A case of sickle-cell anaemia is reported in a young adult Coloured male.

(2) The presence of sickle haemoglobin (haemoglobin S) was established by paper electrophoresis, reduced solubility in phosphate buffer solutions and by increased resistance to denaturation by alkalis.

(3) The disease is rare in South Africa, and in non-European subjects it has only been reported in children of immigrants from areas in which the trait is commonly found.

We are grateful to Dr. Anderson of the South African Institute for Medical Research for performing the investigations on the haemoglobin. We wish to thank Mr. Shevitz and Mr. Ullrich for the photographs and Dr. J. Allen, Superintendent, Baragwanath Hospital, for permission to report this case.

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## ASSOCIATION NEWS : VERENIGINGSNUUS

### TAK WES-KAAPLAND : VOORGESTELDE NUWE NIEUWEVELD (BEAUFORT-WES) AFDELING

Daar is 'n begin gemaak met die stigting van 'n nuwe Afdeling van die Tak in die Beaufort-Wes gebied. Op Saterdag 3 Desember is 'n vergadering op Beaufort-Wes onder die beskerming van die Tak Wes-Kaapland byeengeroep met dr. P. J. Fischer as plaaslike sameroeper. Teenwoordig was van Beaufort-Wes drs. G. J. van der Merwe, P. J. Dannhauser, L. le Roux, A. J. Rootman, P. S. Willers en P. J. Fischer; van Carnarvon dr. P. B. Kock; van Fraserburg dr. E. H. Erasmus; van Nelspoort dr. Robb; en van Kaapstad drs. H. G. O. Owen-Smith, J. H. L. Shapiro, J. A. Currie, P. J. M. Retief, D. G. le Roux, S. Stein en J. K. de Kock.

Die vergadering het om 3 nm. in die Sanlam-saal begin met 'n simposium oor Kortisoon en ACTH. Dr. Dawid le Roux het breedvoerig die lede ingelig omtrent die fisiologie en werking van hierdie middels en die toepassing daarvan by siektetoestande. Hy het klem gelê op die gevare en aanduidings vir gebruik veral in die algemene praktyk. Hy het opgesom deur aan te haal dat ‚Kortisoon niks genees nie. Dit onderdruk slegs die patalogiese proses terwyl dit gegee word. Dus tensy die siekte intussen genees sal hy weer vervat sodra daar met kortisoon opgehou word.' Dr. J. K. de Kock het 'n besondere praktiese lesing gelewer oor die gebruik van kortisoon en ACTH by oogsiektes. Hy is gevolg deur dr. S. Stein wat die gebruik van dié middels by huidsiektes bespreek het. Dit was duidelik van beide laasgenoemde lesings dat kortisoon en ACTH maar van beperkte waarde is en soms baie gevaarlik kan wees.

Dat die lesings byval gevind het is bewys deur die feit dat die sprekers belaai is met vrae en die bespreking het tot na 6 nm. voortgeduur.

Dr. Fischer het die sprekers vir hulle baie interessante lesings bedank en al die lede van die Kaap wat saamgekom het vir hulle opoffering. Hy het gesê dat hy baie teleurgestel is met die opkoms by die vergadering. Etlike lede van naburige dorpe het hom op die laaste laat weet dat hulle nie teenwoordig kon wees nie. Hy het 'n brief van dr. A. W. S. Sichel, voorsitter van Federale Raad voorgelees, waarin Dr. Sichel die hoop uitspreek dat hulle wel 'n Afdeling sal stig en dat hy hulle alle sukses toewens.

Die lede en hulle vrouens het toe by een van die plaaslike hotelle vergader en 'n besondere aangename dinee is geniet. Terwyl die vrouens na die bioskoop toe is het die lede weer vergader om te besluit oor die wenslikheid van 'n nuwe Afdeling in die Beaufort-Wes gebied.

Dr. P. J. M. Retief het verduidelik dat lede van die Vereniging

wat verafgeleë is losweg onder die Tak Wes-Kaapland sorteer sonder dat hulle aan enige Afdeling behoort. Daar is in die Tak Wes-Kaapland alreeds vyf Afdelings, naamlik die Suid-Oostelike (vanaf Riversdal na Oudtshoorn), die Worcester, die Drakenstein, die Noordelike voorstede en die pasgestigte Overberg Afdeling (vanaf Sir Lowry-pas tot by Swellendam). Lede wat nie binne redelike afstand van hierdie Afdelings geleë is nie, geniet geen van die veelvoudige sosiale en akademiese geriewe wat die Vereniging aanbied nie. Die moedertak is angstig om te sien dat nuwe Afdelings gestig word en dat die lede die kans kry om mekaar op vergaderings te ontmoet. Die impetus egter moet van die lede self afkomstig wees en hulle moet aandui of daar wel genoeg ondersteuning vir so 'n Afdeling sal wees.

Dr. van der Merwe het gesê dat hy daarvoor ten gunste is dat 'n Afdeling in die Beaufort-Wes gebied begin word. Hy het jare gelede probeer om 'n Afdeling te bewerkstellig, maar dit het misluk. Dit lyk vir hom of die nodige entoesiasme nou wel daar is.

Dr. Fischer het gesê dat hy van die begin af entoesiasties was en dat hy as sameroeper van hierdie eerste vergadering die indruk gekry het dat die omliggende dorpe die saak sal ondersteun. 'n Goeie naam vir die nuwe Afdeling was belangrik en dit sou nie wenslik wees om dit die Beaufort-Wes Afdeling te noem nie. Hy het geneem dat soiets as die Nieuweveld Afdeling meer paslik en omvattend is.

Verskeie ander lede het deelgeneem aan die bespreking en dit was duidelik dat die plaaslike lede sterk ten gunste van die stigting van 'n nuwe Afdeling was. Drs. Currie, Owen-Smith en J. H. L. Shapiro het elk bygedra om die plaaslike lede in te lig omtrent die baie voordele van 'n aktiewe deelname aan die Mediese Vereniging van Suid-Afrika.

Dit is toe voorgestel deur Dr. v. d. Merwe dat 'n Afdeling van die Tak Wes-Kaapland in die Beaufort-Wes gebied gestig word. Dit is eenparig aangeneem. Dit is toe besluit om 'n interim komitee te kies wat reëlings sal tref vir die eerste en stigtingsvergadering, wat vroeg in 1956 gehou sal word. Die volgende lede is tot die komitee benoem, naamlik drs. Fischer, Dannhauser en L. le Roux.

Dr. Fischer het al die lede toe bedank vir hulle teenwoordigheid en belangstelling en veral die lede wat ver gery het. Dr. Owen-Smith het die lede van Beaufort-Wes baie hartlik bedank namens die Kaapstadse lede vir hulle vriendelikheid en gasvryheid en as voorsitter van die Tak Wes-Kaapland die nuwe Afdeling alle heil en seën toegewens.

## NEW REGULATIONS FOR THE CONTROL OF RADIO-ISOTOPES FOR MEDICAL USE : NUWE REGULASIES VIR DIE BEHEER VAN RADIO-ISOTOPE VIR MEDIESE GEBRUIK

Under the provisions of the Atomic Energy Act, 1948, no person in South Africa may, without written consent of the Atomic Energy Board 'produce or otherwise acquire or dispose of or import into or export from the Union or be in possession of or use any radio-active element or any radio-active isotope of any element other than radium and its disintegration products'. The Atomic Energy Board has authorized the President of the South African Council for Scientific and Industrial Research to control the use of radio-isotopes in South Africa under this clause of the Act and has also empowered him to issue the necessary written authority to approved users. Because the medical use of radio-isotopes has serious potential dangers for the patient, the medical officer and the personnel concerned with the administration thereof, the President established a screening committee to advise him regarding the medical use of radio-isotopes. This committee has recently been re-constituted in order to include a greater number of experts in this field. At a series of meetings the matter has been thoroughly investigated and the opinion has been expressed that the medical use of radio-isotopes in South Africa should be subjected to stricter control, especially in the light of practice followed overseas. A new set of regulations for this purpose has been drafted and accepted by the President. These new regulations will apply as from 1 February 1956, and authorization for the use of radio-isotopes for medical purposes after this date will only be granted to persons who are able to comply fully with the regulations. Persons already using radio-isotopes will be granted a period of 3 months to bring their practices into conformity with the new regulations. During this period of 3 months, ending on 30 April 1956, persons already using radio-isotopes will be supplied according to the old basis.

All persons or organizations having interests in the medical use of radio-isotopes are advised to obtain a copy of the new regulations from the Director, National Physical Laboratory, P.O. Box 395, Pretoria, as soon as possible.

Kragtens die Wet op Atoomkrag van 1948 mag niemand in Suid-Afrika, behalwe met skriftelike magtiging van die Raad op Atoomkrag, ,'n radioaktiewe element of 'n radioaktiewe isotoop van 'n element behalwe radium en ontbindingsprodukte daarvan, voortbring of op ander wyse verkry of van die hand sit of in die Unie invoer of daaruit uitvoer of in besit daarvan wees of dit gebruik nie'. Die Raad op Atoomkrag het die President van die W.N.N.R. gemagtig om beheer uit te oefen oor die gebruik van radio-isotope in Suid-Afrika kragtens hierdie klousule van die wet, en hom verder gemagtig om die nodige skriftelike magtigings aan goedgekeurde verbruikers uit te reik. Aangesien die mediese gebruik van radio-isotope ernstige potensiële gevare inhou vir beide die pasiënt, die medikus en die personeel wat betrokke is by die toediening daarvan, het die President 'n keuringskomitee vir die mediese gebruik van radio-isotope in die lewe geroep om hom in hierdie verband te adviseer. Die Keuringskomitee is onlangs hersaamgestel om op dié wyse meer deskundiges daarop te kry. Op 'n reeks vergaderings is die saak deeglik uitgepluis en is die mening uitgespreek dat die mediese gebruik van radio-isotope in Suid-Afrika aan strenger beheer onderwerp moet word, veral in die lig van die praktyke, in hierdie verband in die buiteland gevolg word. 'n Nuwe stel regulasies is vir die doel opgestel en deur die President aanvaar. Die nuwe regulasies sal op 1 Februarie 1956 in werking tree en magtiging vir die gebruik van radio-isotope vir mediese doeleindes sal na daardie datum slegs verleen word aan persone wat volledig aan die voorwaardes wat in die nuwe regulasies gestel word kan voldoen. Reeds bestaande verbruikers van radio-isotope word 3 maande gegun om, waar hulle praktyk nie reeds in ooreenstemming met die nuwe regulasies is nie, dit wel in ooreenstemming daarmee te bring. Gedurende hierdie 3 maande, wat op 30 April 1956 ten einde loop, sal die reeds bestaande verbruikers op die ou basis van isotope voorsien word.

Alle persone of organisasies wat belang het by die mediese gebruik van radio-isotope, word aangeraai om so spoedig moontlik 'n kopie van die nuwe regulasies te verkry van die Direkteur, Nasionale Fisiese Laboratorium, Posbus 395, Pretoria.

## THE FACTS OF ACCIDENTS : FEITE IN VERBAND MET ONGEVALLE

1. *The Magnitude of the accident problem.* For the year 1952, compensation was paid and/or medical aid incurred in respect of approximately 170,000 cases of injured workers by all carriers of accident risks.

2. *The Human Cost of accidents.* Of the total of 170,000 people injured in occupational accidents, 20,624—or the equivalent of

1. *Reuse omvang van die vraagstuk.* Vir die jaar 1952 het die maatskappye wat teen ongevalle verseker, gesamentlike skadeloosstelling uitbetaal en/of mediese hulp verleen ten opsigte van ongeveer 170,000 gevalle van beseerde werkers.

2. *Wat die mense as gevolg van ongevalle moet inboet.* Uit die 170,000 mense wat in bedryfsongevalle beseer is, het 20,624—'n

the population of a fair-sized town—suffered permanent disablement. And 1,495 people lost their lives.

3. *The Time Lost due to accidents.* As a result of these accidents the working time lost to employers and workers amounted to about 2,800,000 man-days.

4. *The Money Spent in compensating accidents.* The known and estimated costs of compensation for the year 1952 amounted to the sum of approximately £3½ million. But to this great sum must be added the hidden cost of accidents which are usually estimated to be from three to four times as great as the visible cost.

5. *The Cost of Medical Aid to victims of accidents.* Approximately £1 million was expended in rendering medical aid to those workers who became the victims of accidents in the year 1952.

6. *What physical agencies caused these accidents?* The main physical agencies responsible for these accidents were Machines (15·2%), Vehicles (13·5%), Hand Tools (8·5%), Explosives, Fire and Hot Substances (3·4%) and miscellaneous agencies (56·8%).

7. *What part does the human factor play in accidents?* Experience in most countries goes to show that the *human factor* is the major cause of occupational accidents. Mental and physical fitness, thorough training and proper instruction, selection and supervision of workers help greatly to ensure safety and promote efficiency.

8. *What can be done to prevent accidents?* Much can be done. But only good teamwork by employers and workers applied at the place where accidents happen is really effective. Prevention can only be done *by* a factory and not *for* it.

9. *What can employers and workers do? Employers* can: (*a*) Create safe and healthy working conditions through good factory housekeeping, such as good lighting and ventilation, proper storage and lay-out, safe and orderly working methods, a safety colour scheme, proper factory cleaning, satisfactory personal washing and other facilities, regular maintenance of equipment and structure and daily supervision of operations from the safety point of view to eliminate hazards.

(*b*) Promote safety and health at the work-place by actively encouraging and participating in measures towards this end.

(*c*) Create a safety and health organization *inside* the factory, consisting of representatives of management and selected workers, which will be responsible to top management.

*Workers* can: (*a*) Cooperate faithfully with management in all measures to ensure a safe and healthy working environment.

(*b*) Serve on any organization or in any capacity for this purpose.

(*c*) Practise safe ways of working and comply with safety rules and instructions for the protection of themselves and their workmates.

(*d*) Qualify in first-aid so as to help themselves and others.

(*e*) Remember that the best way of working is the Right Way and that the Right Way is also the Safe Way.

10. *Who really foots the bill for accidents?* Employers have to bear the direct monetary cost of accidents. But a high accident rate also increases production costs, and so it is the worker himself, as a consumer of goods, who ultimately pays—besides suffering pain and disablement. So for both employers and workers safety measures are undoubtedly less expensive than accidents. Remember: Accidents don't just happen—*they have remediable causes.*

*Supplied by the Office of the Workmen's Compensation Commissioner.*

getal gelyk aan die bevolking van 'n groot dorp—permanente verminking gely, en 1,495 het die lewe ingeskiet.

3. *Tyd verloor as gevolg van ongevalle.* As gevolg van hierdie ongevalle het die werktyd wat vir werkgewers en werknemers verlore gegaan het, ongeveer 2,800,000 mandae beloop.

4. *Geld aan skadeloosstelling i.v.m. ongevalle bestee.* Die vasgestelde en beraamde skadeloosstellingskoste vir die jaar 1952 het die som van ongeveer £3½ miljoen bedra. By hierdie groot som moet egter nog die onsigbare ongelukskoste gevoeg word, en dit word gewoonlik op drie of vier maal meer as die sigbare koste gestel.

5. *Wat mediese hulp aan die slagoffers van ongevalle gekos het.* Ongeveer £1 miljoen is bestee vir mediese hulp ten opsigte van werkers wat in 1952 die slagoffers van ongevalle was.

6. *Watter fisiese oorsake was vir hierdie ongevalle verantwoordelik?* Die vernaamste fisiese oorsake was die volgende: Masjienerie (15·2%), Voertuie (13·5%), Handgereedskap (8·5%), Plofstowwe, Brand en Warmvoorwerpe (3·4%) en diverse (56·8%).

7. *Watter rol speel die menslike faktor by ongevalle?* Die ondervinding van die meeste lande leer dat die *menslike faktor* die vernaamste oorsaak van bedryfsongevalle is. Geestelike en liggaamlike geskiktheid, deeglike opleiding en behoorlike onderrig, die keuring van en toesig oor werkers dra grootliks by tot veiligheid en doeltreffende werkverrigting.

8. *Wat kan gedoen word om ongevalle te voorkom?* Daar kan veel gedoen word. Slegs goeie spanwerk tussen werkgewers en werknemers op die plek waar die ongevalle plaasvind, is werklik doeltreffend. Voorkoming kan slegs *deur* 'n fabriek self, en nie *vir* 'n fabriek bewerkstellig word nie.

9. *Wat kan werkgewers en werknemers doen? Werkgewers* kan: (*a*) Veilige, gesonde werktoestande skep deur doeltreffende fabriekshuishouding, soos goeie beligting en ventilasie, behoorlike opberging en beplanning, veilige en ordelike werkmetodes, 'n veiligheidskleurskema, deeglike skoonmaak van fabrieke, bevredigende was- en ander fasiliteite vir die personeel, die gereelde onderhoud van die gereedskap en die gebou en daaglikse toesig oor die werk met die oog op veiligheid en die uitskakeling van alle risiko's;

(*b*) Veiligheid en gesondheid in die werk lokaal bevorder deur daadwerklik alle maatreëls wat uit hierdie doel getref word, aan te moedig en dit self te beoefen;

(*c*) 'n Veiligheids- en gesondheidsorganisasie *in* die fabriek stig wat uit verteenwoordigers van die bestuur en uitgesoekte werknemers bestaan, en aan die direksie self verantwoordelik is.

*Werknemers* kan: (*a*) Getrou met die bestuur saamwerk in verband met alle maatreëls wat 'n veilige, gesonde werkomgewing ten doel het;

(*b*) In enige bevoegdheid, of op enige liggaam wat hierdie doel nastreef, dien;

(*c*) Veilige werkmetodes toepas, en veiligheidsmaatreëls en instruksies vir die beskerming van hulleself of van hulle werkmaats in ag neem;

(*d*) In eerstehulp opgelei word om hulleself en andere te kan help;

(*e*) Onthou dat die beste manier van werkverrigting die regte manier is, en dat die regte manier ook die veiligste manier is.

10. *Wie betaal werklik die gelag in verband met ongevalle?* Werkgewers dra die direkte geldelike koste i.v.m. ongevalle. 'n Hoë ongeluksyfer verhoog egter ook die produksiekoste en so word dit die werker self, as 'n verbruiker van goedere, wat uiteindelik daarvoor betaal—behalwe dat hy ook die ongeskiktheid moet verduur en die pyn moet ly. Vir sowel werkgewers as werknemers is veiligheidsmaatreëls dus ongetwyfeld goedkoper as ongevalle.

Onthou: Ongelukke gebeur nie sommer nie—hulle het oorsake wat verwyder kan word.

*Voorsien deur die Kantoor van die Ongevallekommisaris.*

## THE LATE DR. T. B. DAVIE

*Dr. E. H. Burrows writes*: I write to add my tribute to Dr. Davie as one of the younger generation who knew him only as a university principal. The fact that he had already won renown in Britain as professor of pathology and Dean of a medical faculty was somehow always secondary in importance to the imposing figure of Dr. Davie the Principal. This was perhaps because he seemed so completely suited to the post—as if it had been created for him.

As a fairly active member of undergraduate 'varsity life at the time, I was privileged to witness the gusto with which he literally blew into his office in 1948, and set about tackling people and problems. At first glance he was almost casual, but heaven help the student who misjudged the man and tried to 'pull a fast one' on the Principal. (One of my most painful undergraduate memories is a dressing-down that I received from him—very justifiably—for failing to keep the university peace.)

But he was a just, steadfast and lovable man. To his students he unconsciously set a glorious example, for he was one of those fortunate human beings who carry their honesty on their faces, and whose own uprightness inspires it in others. For Dr. Davie one felt instinctively that one should do one's best. By more than anything else, he gained the students' confidence by his phenomenal capacity for hard work. He seemed to be a living embodiment of the old saying that nothing is ever achieved without it. Apart from committee work, he doggedly attended the social round, year in and year out, displaying the same academic meticulousness that he did in his contact with the public, and had doubtless done as a teacher of pathology.

To his students, he seemed always to be present, on the spot; and shrewdly, as the young will judge, they respected him for it and were, I think, proud of him as their Principal.

The prosperity and the future of the University of Cape Town was his life-blood. He must have loved it very deeply to have been able to speak as passionately, as he sometimes did, of its ideals and its future. He had complete faith in the universal nature of the academic tradition, and doggedly refused to yield an inch to the exigencies of current political doctrines. This steadfastness of principle in the face of powerful opposition impressed his opponents immensely and won for him great personal loyalty and respect.

The last time that I saw Dr. Davie was at a joint staff-student meeting in August last year. I had not seen him for some years, and the effects of his disease—and its treatment—upon his person were so severe that I was deeply distressed to see him struggle to his seat. But the old fire was still there, the breezy aside, the almost ruthless attack at the core of the problem, the geniality and the intensity of purpose. A thought struck me then that recurs to me now, that I had been very privileged to know and assist Dr. Davie. I am sure that there are many of us who must have this thought, and who regret, to a personal degree as well as in the wider sense, the passing of one of the country's greatest academic sons.

## PASSING EVENTS : IN DIE VERBYGAAN

*Dr. Neil Bailey, Dip. O. & G.*, has commenced practice as an obstetrician and gynaecologist at 64 Moray House, 199 Jeppe Street, Johannesburg.

* * *

*Dr. Neil Bailey, Dip. O. & G.*, het as ginekoloog en verloskundige begin praktiseer, te Moray House 64, Jeppestraat 199, Johannesburg.

* * *

*The Annual General Meeting of the Cape Town Sub-Group of the Society For Industrial Health* will be held on Wednesday, 25 January at 8.15 p.m. at Medical House, 35 Wale Street, Cape Town.

Agenda—Annual report and election of office bearers.

All practitioners engaged in full-time or part-time industrial practice are invited.

* * *

*South African Society of Anaesthetists: Cape Western Branch.* Dr. Victor Goldman, Honorary Consultant Anaesthetist to the Eastman Dental Clinic and the University of London Postgraduate Medical Federation, will deliver a lecture on *Anaesthesia for Modern Surgical Operations* in the A-Floor Lecture Theatre, Groote Schuur Hospital, Cape Town, at 8.15 p.m. on Friday, 17 February 1956.

*In the Speech from the Throne* at the opening of Parliament on 13 January 1956, the Governor-General announced that the Government proposed proceeding with the Bill to amend the Nursing Act and the Bill to control Supplementary Health Services, both of which were referred to Select Committees of the House of Assembly in the previous session.

The problem of silicosis was receiving special attention and a new Silicosis Bill would be introduced this session.

* * *

*Union Department of Health Bulletin.* Report for the 8 days ended 5 January 1956.

*Plague, Smallpox:* Nil.

*Typhus Fever, Cape Province:* No further cases have been reported from the Port Elizabeth Municipal area and the Matatiele district since the notifications of 8 December 1955. These areas may now be regarded as free from infection.

*Epidemic Diseases in Other Countries.*

*Plague:* Nil.

*Cholera* in Dacca (Pakistan).

*Smallpox* in Herat, Kandahar (Afghanistan); Moulmein, Rangoon (Burma); Phnom-Penh (Cambodia); Ahmedabad, Allahabad, Delhi, Kanpur, Madras, Nagpur, Tellicherry (India); Dacca, Karachi (Pakistan); Tourane (Danang) (Viêt-Nam); Nairobi (Kenya).

*Typhus Fever* in Baghdad (Iraq).

## OFFICIAL ANNOUNCEMENT : AMPTELIKE AANKONDIGING

### VACANCY—ASSISTANT EDITOR

Applications are invited from medical practitioners for the post of Assistant Editor in the service of the Medical Association of South Africa at its Head Office in Cape Town.

The salary scale attaching to the post is £1,250 × 50—1,750 per annum, plus an annual cost-of-living allowance of £176 for single men and £352 for married men. The commencing salary will be determined according to journalistic experience.

The successful applicant must contribute to the Association's Superannuation Fund. He will also be expected to assume duty as soon as possible after appointment.

Applications must reach the Secretary, Medical Association of South Africa, P.O. Box 643, Cape Town, on or before 2 March 1956.

A. H. Tonkin
*Secretary*

Medical House
Cape Town
23 December 1955

### VAKATURE—ASSISTENT-REDAKTEUR

Aansoeke word van geneeshere ingewag vir die betrekking van Assistent-Redakteur in diens van die Mediese Vereniging van Suid-Afrika, by die Hoofkantoor te Kaapstad.

Die salarisskaal aan die pos verbonde is £1,250 × 50—1,750 per jaar, plus 'n jaarlikse duurtetoeslag van £176 vir 'n ongetroude en £352 vir 'n getroude man. Die aanvangssalaris sal volgens joernalistieke ondervinding bepaal word.

Die suksesvolle kandidaat moet by die Vereniging se pensioenskema aansluit. Hy sal ook verwag word om so spoedig moontlik na aanstelling diens te aanvaar.

Aansoeke moet die Sekretaris, Mediese Vereniging van Suid-Afrika, Posbus 643, Kaapstad, bereik vóór of op 2 Maart 1956.

A. H. Tonkin
*Sekretaris*

Mediese Huis
Kaapstad
23 Desember 1955

# BOOK REVIEWS : BOOK RESENSIES

## MILITÊRE MEDIESE GESKIEDENIS

*De Medische Geschiedenis van Een Infanterie-Bataljon der Koninklijke Landmacht Gedurende Drie Jaar Actieve Dienst op Java* 1946-1950. Deur dr. F. Doeleman. Bl. 234. Geb. f. 10.50. Assen: Van Gorcum & Comp. N.V.

*Inhoud:* 1. Het Tropische Milieu. 2. Het Sociale Milieu. 3. De Medische Verzorging van het Bataljon. 4. Morbiditeit en Mortaliteit. Slotbeschouwing. Samenvatting: Summary.

Hierdie boek is geskryf deur 'n leërdokter, wat die gawe het om die verband te sien in oënskynlik onbelangrike feite en syfers en om dit dan op 'n unieke manier te beskryf. Sy insig in die fisiologiese en sielkundige veranderinge wat deur die druk van uitwendige omstandighede by sy manskappe onstaan het, is besonder helder.

Die beskrywing van die omstandighede van die leefwyse van 'n groep, tussen die militêre en die burgerlike, in 'n ander klimaat, met 'n ander voeding en 'n ander bevolking, is meesterlik van vorm en inhoud.

Die boek bied baie meer aan as wat die titel laat verwag; dit gee 'n besielende inleiding in die ‚ekologie', d.w.s. daardie tak van mediese wetenskap wat die invloed van die natuurlike uitwendige omstandighede (klimaat, bodem, voeding, ens.) en van die sosiale omstandighede op die mens, sowel fisiologies as sielkundig, bestudeer. 'n Deeglike kritiek beklemtoon die preventiewe betekenis van maatreëls wat teen die ongunstige invloede in hierdie omstandighede moontlik toegepas kan word.

Die boek bewys dat ieder onderneming 'n mediese kant het, wat 'n diepgaande sielkundige studie werd is.

Die opgawe van die mediese literatuur aan die einde van elke hoofstuk getuig van die groot belesenheid van die skrywer en is met besonder noukeurigheid opgestel.

Hierdie boek is dus nie enkel 'n bron van mediese kennis vir die militêre mediese beampte nie, maar sal ook van groot waarde wees vir elkeen wat belang stel in sosiale geneeskundige probleme, veral in tropiese en subtropiese klimate.

E.J.

## DEXTRAN

*Dextran: Its Properties and Use in Medicine.* By John R. Squire, M.D., F.R.C.P. and J. P. Bull, M.D. *et al.* Pp. 91. 15s. Oxford: Blackwell Scientific Publications. 1955.

*Contents:* 1. Plasma Substitutes. 2. Chemistry of Dextran. 3. Behaviour of Dextran in the Body and Effect on Body Constituents. 4. Specification of Dextran. 5. Clinical Uses of Dextran. 6. Experimental Uses of Dextran. Appendices. Index.

This small book adequately covers the subject of the use of plasma substitutes or plasma volume-expanders. It deals in particular with Dextran, which has now been part of the medical armentarium for over 12 years. Dextran is derived from sucrose and consists of long chains of glucose. The greater part of dextran has a molecular range about 80,000 and it exerts a colloidal osmotic pressure 1½ times that of plasma. The authors critically evaluate its use and conclude that it is of definite value in a number of conditions and, even more so, in those parts of the world where, for climatic, financial or other reasons, transfusion services cannot be organized.

Large molecules of dextran tend to cause rouleaux formation of erythrocytes but, in practice, no harm has resulted from this effect, although certain blood-transfusion services exaggerate this property and contend that it interferes with blood compatibility tests. Equally large rouleaux-forming tendencies occur in the course of many infections and other diseases as the result of spontaneous increases in plasma fibrinogen and other large endogenous molecules. Workers have shown that satisfactory compatibility tests can be obtained after administering as much as 3,000 c.c. of 6% dextran. Nevertheless, it is always wise and simple to withdraw a 4-c.c. specimen of blood before any dextran is given. The best indications for dextran administration are shock, diffuse peritonitis, paralytic ileus, burns and nephrotic oedema. When there is a blood loss of more than 2 litres dextran may be used temporarily whilst awaiting blood replacement.

This contribution to medical literature will be particularly useful to medical scientists and to those workers in small hospitals where facilities for whole-blood transfusions are poor.

A.J.L.

## FLUID AND ELECTROLYTES

*Fluid and Electrolytes in Practice.* By Harry Statland, M.D. Pp. 206 + xiii, with tables and illustrations. 35s. London: Pitman Medical Publishing Co. Ltd. 1954.

*Contents:* 1. Fluid Structure. 2. Movements of Fluids in the Body. 3. Intake, Output and Variations. 4. Prevention of Imbalance in the Postoperative Patient. 5. Water Depletion. 6. Salt Depletion. 7. Mixed Depletions, Potassium Alterations and Magnesium. 8. Acid-Base Balance. 9. Treatment of Major Depletions. 10. Oedema and Diuretics, and Water Intoxication. 11. Heart Disease. 12. Kidney and Urologic Diseases. 13. Diabetic Acidosis. 14. Pediatric Fluid Balance. 15. Burns, Cirrhotic Ascites, Toxemias of Pregnancy. Bibliography. Index.

A relative dearth for many years has now been replaced by a spate of books on this important aspect of medicine and surgery. There are still many—too many—in practice who do not yet know what a milli-equivalent means; there is also a widespread ignorance of the indications for giving various types of electrolyte solutions. This book should be a great help to those wishing to correct their deficiencies in this respect.

The author has made a genuine and successful attempt to present in a lucid form current knowledge of fluid and electrolytes in health and disease. To do this he has necessarily had to be superficial, but this is not a fault in a work of this kind. There is an excellent bibliography for the more curious. Sections on treatment are sound and based on physiological principles; a possible criticism is that they might well have been more detailed. An attractive feature is the special attention given to the management of cardiac and renal disease and burns.

The tables and illustrations have the merit of being simple and there is a good index. Only benefit can result from reading this book.

J.H.

## RHEUMATOIDE ARTHRITIS

*De Maatschappelijke Betekenis van Rheumatoide Arthritis Voor de Patient Zelf.* Deur dr. B. J. ter Bals. Bl. 142. Geb. f. 7·25. Assen: Van Gorcum en Comp, N.V.

*Inhoud:* 1. Inleiding. 2. Literatuuroverzicht. 3. Probleemstelling. 4. Aard van het Materiaal. 5. Methodiek van het Onderzoek. 6. Waardering der Verkregen Gegevens. 7. Wijze van Verwerking van de Gewaardeerde Gegevens. 8. Overzichtscijfers en hun Betekenis. 9. Correlaties.

Hierdie werk vorm die derde deel van 'n reeks werke, *Elementen voor de Kennis der Volksgezondheid*, en behandel die mediesmaatskaplike betekenis van rumatiekagtige gewrigsontsteking vir dié wat self daaraan ly. Dit is dus feitlik 'n eerste mediese-sosiologiese studie oor dié besondere kwaal. Veral word die sosiaalekonomiese betekenis daarvan beklemtoon.

Vooraf gee die outeur 'n literatuuroorsig van 1923 tot 1952, dus van vóór-, oorlogs-, en na-oorlogsjare, toe Kahlmeter die eerste statistiese oorsig oor rumatiese siekteverskynsels bestudeer het (op grond van die Sweedse Pensioenfonds) oor die jaar 1918, tot en met die uitvoerige studie van de Belcourt in medewerking met 'n argitek, gedurende die jare 1951 en 1952. Terloops, de Belcourt was dan ook die eerste rumatoloog wat, te Groningen, so 'n studie onderneem het.

Al hierdie ondersoekers het egter rumatiese aandoenings as sulks sonder onderskeid saam bestudeer en geëvalueer. Die bevindings van alle navorsers in Europa, Brittanje en Amerika stem hoofsaaklik daarin ooreen dat daar feitlik geen korrelasie tussen rumatiese aandoenings en vogtigheidstoestand, trauma, harde werk of klimaatstoestande te vind is nie; dat rumatiekagtige gewrigsletsels 'n groot persentasie uitmaak van alle rumatiese aandoenings; dat rumatiese kwale jaarliks miljoene werksdae en groot somme geld verlore laat gaan by alle tot dusver ondersoekte lande en gemeenskappe. Verder skyn dit dat hoewel die getal rumatiese gevalle gewoonlik teringgevalle ver oortref, daar

proporsioneel veel meer geld aan laasgenoemde as aan eersgenoemde bestee word. Dit is natuurlik met die oog op voorkoming en behandeling!

In die algemeen geneem, varieer die frekwensie van rumatiekagtige aandoenings in Europa en Amerika tussen 13·5% en 19%. Verder blyk dit dat ekonomies, hierdie aandoenings tussen 5·7% en 20% (meestal 15%-20%) van alle siektegelde opeis, terwyl die invalidegevalle tussen 5% en 16·8% beloop. Al die skrywers het ook 'n definitiewe samehang tussen rumatiese morbiditeit en beroep en/of maatskaplike welstand, al dan nie, gevind.

In teenstelling egter met al die besproke werkers, het Ter Bals 'n spesiale ondersoek van stapel gestuur na die oorsake van rumatiekagtige gewrigsletsels en hul maatskaplike betekenis vir die lyers self. Hierby het hy aspekte ondersoek soos geslag, leeftyd by aanvang van die siektebeeld, erflikheid, konstitusiefaktore, maatskaplike stand, soort werk, woningsomstandighede, kledingsgewoontes, klimaatsomstandighede, en les bes, die sosiaalsielkundige faktore wat die siekte beïnvloed.

In 'n lang hoofstuk gee die skrywer ,oorsigtelike syfers en hul betekenis' en sluit met 'n ander af waarin hy alle bevindings probeer korreleer. Daar is samevattings in Nederlands, Engels en Frans, gevolg deur 7 bylaes en 5 tabelle.

Vir iemand wat 'n dergelike ondersoek in Suid-Afrika wil onderneem, behoort hierdie werk seker baie nuttig te wees.

C.G.A. v. W.

## COMMUNICABLE DISEASES

*Communicable Diseases.* Third edition. By Franklin H. Top, A.B., M.D., M.P.H., F.A.C.P., F.A.A.P., F.A.P.H.A. Pp. 1208, with 109 illustrations. £7 17s. 6d. St. Louis: The C. V. Mosby Company. 1955.

*Contents:* 1. Infection and Immunity. 2. Epidemiology. 3. Regulations Governing Control of Communicable Diseases. 4. Specific Prevention of Certain Communicable Diseases. 5. Serums and Serum Reactions. 6. Sulfonamides. 7. Antibiotics. 8. Management of Communicable Diseases in the Home. 9. Management of Communicable Diseases in the Hospital. 10. Coccidioidomycosis. 11. Histoplasmosis. 12. Diphtheria. 13. Leprosy. 14. Meningitis. 15. Pertussis. 16. Pneumococcal Pneumonia. 17. Streptococcal Infections, Hemolytic. 18. Rheumatic Fever. 19. Tuberculosis. 20. Vincent's Infection. 21. Chicken-Pox. 22. The Common Cold. 23. Infectious Encephalitis. 24. Influenza. 25. Lymphocytic Choriomeningitis. 26. Measles. 27. Mononucleosis, Infectious. 28. Mumps. 29. Primary Atypical Pneumonia. 30. Poliomyelitis. 31 Psittacosis. 32. Rubella. 33. Smallpox. 34. Brucellosis. 35. Diarrhea of the Newborn, Epidemic. 36. Dysentery, Amebic. 37. Dysentery, Bacillary. 38. Food Poisoning. 39. Hepatitis, Viral. 40. Paratyphoid Fever. 41. Trichinosis. 42. Typhoid Fever. 43. Chancroid. 44. Gonorrhea. 45. Lymphogranuloma Venereum. 46. Ophthalmia Neonatorum. 47. Syphilis. 48. Keratoconjunctivitis, Epidemic. 49. Trachoma. 50. Impetigo. 51. Granuloma Inguinale. 52. Pediculosis. 53. Ringworm of the Scalp. 54. Scabies. 55. Anthrax. 56. Cat-Scratch Fever. 57. Hookworm Disease. 58. Leptospirosis. 59. Tetanus. 60. Tularemia. 61. Malaria. 62. Rickettsial Diseases. 63. Rabies. Appendix. Glossary.

This volume is written by Dr. Franklin H. Top and a team of experts. It is the 3rd edition of a book first published in 1941—a sign of popularity and progress in keeping up with the rapid advances in knowledge.

The first 9 chapters adequately cover the essential general principles governing the control of communicable, or infectious diseases. To prevent duplication microbiology is omitted, but active immunization, and the administration of serum, antibiotics and sulphonamides, are fully treated from a practical aspect. In addition the relative Government Control Regulations in the U.S.A. are given, together with a full list of diseases reportable (notifiable).

The actual diseases are described in 3 groups according to the portal of entry of the causal organisms—a method neither constant nor beyond criticism.

A. *Diseases with the Respiratory Tract as Portal of Entry.* A surprise inclusion under this heading is poliomyelitis, in which the portal of entry is controversial. The fungus diseases coccidioidomycosis and histoplasmosis are described in detail—a prominence perhaps surprising but probably commensurate with their frequency in the States.

B. *Diseases with the Gastro-intestinal Tract as Portal of Entry.* All the accepted communicable diseases under this heading are described, with the exception of cholera.

C. *Diseases with Mucous Membrane and Skin as Portal of Entry through Contact, Trauma and Bites.* This section includes many diseases not usually found in a book on infectious diseases. The venereal diseases, including ophthalmia neonatorum, are fully described: certain eye diseases such as trachoma and epidemic conjunctivitis, and skin diseases such as impetigo, ringworm, scabies and pediculosis are all fully treated. Plague is omitted entirely.

The systematic description of the various communicable diseases follows the pattern of other text-books. Descriptions are mainly brief and to the point, so that the book is admirable as a text-book for students. Some diseases are more fully dealt with than others, e.g. pneumococcal pneumonia is minutely described whereas diphtheria is not. The book is deliberately intended for the nursing profession too. Thus the general nursing care of the communicable diseases in the home and in hospital is fully described in the general section, and the special nursing features of each disease are considered under treatment. References are listed at the end of each chapter.

Some features are difficult to accept, and detract from the value of the book:

1. In the treatment of laryngeal diphtheria intubation is given preference over tracheotomy. In actual fact, intubation has proved so unreliable in the hands of most experts, that it has been abandoned.

2. The discontinuance of intrathecal streptomycin in the treatment of tuberculous meningitis because of 'frequent and severe untoward reactions' and 'inability to discern any advantage' appears to be a technical admission of failure, and failure to consider the excellent and durable results obtained with I.T. injections as standard treatment.

3. In the description of poliomyelitis a surprising prominence is given to Sister Kenny's theories and treatment. Yet no account is given of Prof. Trueta's important scientific work on the localization of virus in the spinal segments as a result of trauma and fatigue. In addition, intermittent positive pressure respiration treatment for cases with respiratory insufficiency of combined spinal and bulbar type, is not mentioned.

These important matters preclude unqualified praise of this book. However, it is a handsome volume, clearly printed on beautiful paper, now seldom seen in British books. An outstanding feature of the book is its really beautiful and accurate photographic reproductions properly placed in the text. Even so, £7 17s. 6d. is a heavy price to pay for it.

H.R.A.

## THE LYMPH-STASIS THEORY OF CARCINOGENESIS

*The Genesis and Prevention of Cancer.* By W. Sampson Handley, M.S. (Lond.), F.R.C.S. Second edition. Pp. 320 + xix, with 114 illustrations. 21s. London: John Murray. 1955.

*Contents:* 1. Introductory. 2. The Lymphatic Anatomy of the Skin. 3. Lymphangitis. 4. The Papilloma Product of Lymph-Stasis. 5. Papilloma and Adenoma as Precursors of Cancer. 6. The Pathology of Lupus. 7. Lupus Carcinoma. 8. The Pathology of Chronic Mastitis and its Relations to Breast Cancer. 9. Malignant Tumours Arising from Congenital Skin Malformations and Rests. 10. Radiation and Cancer. 11. Occupation Cancer and its Etiology. 12. Pre-Cancerous Changes in the Connective Tissue and their Relation to Irritation. 13. The Irritation Theory of Cancer. 14. How does Lymph-Stasis Induce Malignancy? 15. Cancer Prevention in the Light of the Lymph-Stasis Theory. 16. The Nature of Malignancy. 17. Criticisms of the Lymph-Stasis Theory. 18. Summary of Argument. 19. Recent Work on Pathogenesis. 20. The Future of Cancer Prevention. Appendix. Indices.

The author, well known for his demonstration of lymphatic permeation in the spread of certain cancers, again presents his theory that cancer itself is caused by prolonged local lymph-stasis, showing that changes in lymphatics are often demonstrable in precancerous conditions. Such changes occur in lupus, and are claimed, somewhat less convincingly, to be present in papillomas, intradermal naevi, chronic mastitis, and dermatitis following irradiation or exposure to chemical carcinogens. The evidence for lymph-stasis is histopathological rather than clinical, and remarkably enough, filarial elephantiasis, apart from one case, is not considered. No mention is made of those cancers which arise in areas like the central nervous or osseous systems, devoid of lymphatic drainage.

The chief defect in the theory is its lack of experimental confirmation, since lymph-stasis induced by non-carcinogenic substances, like silica, should reproduce all the effects, including the time relations, of exposure to the most potent carcinogen. Such proof, the author admits, is lacking, and one wonders how far he has shown lymph-stasis as a cause of cancer, distinct from a process concomitant with the immune reactions that accompany neoplastic change.

Prevention is discussed in greater detail in this edition, but in general this is logically unrelated to the argument. Naturally, as suggested in the first edition (*The Genesis of Cancer* 1931), reduction in lymph-stasis by control of infection—tuberculous, syphilitic, and staphylococcic—should reduce the frequency of cancer. The major part of the discussion, however, refers to specific preventive measures directed against particular cancers. Preputiotomy or dorsal incision of the prepuce is claimed to be just as effective as complete circumcision and is recommended in all infants to eliminate carcinoma of the penis and reduce that of the cervix. X-ray treatment of chronic mastitis and improved oral hygiene are recommended, and the author advises that young people should be warned of the ultimate dangers of heavy cigarette smoking. Ultra-violet carcinogenesis, mentioned in the discussion of causes, is omitted in this relatively superficial discussion of prevention.

Apart from a few minor changes, the first 250 pages reproduce the first edition verbatim, while chapters 19 and onwards are new. This may explain the presence of a number of unnecessary defects in the earlier part of the book, which is somewhat out of date. For example, Fibiger's claim to have produced stomach cancer in rats infected with *Spiroptera neoplasticum* is now discredited. Few histopathologists would accept the conclusion that the cells of intradermal naevi are derived from lymphatic endothelium, or would regard the pure intradermal naevus as a precursor of malignant melanoma. Verruca vulgaris hardly merits description as precancerous, and senile keratoses should not be classified with it. Although the work of Leitch is mentioned in several places in the text (not all included in the author index) yet no references to this important work are given. Some of the photographs are poor.

The style is attractive, and the writer's comments are often trenchant. The irritation theory of carcinogenesis, like the bed of Procrustes, has long pretended to fit all comers: Handley describes one distinguished author's difficulty in applying it to the melanomas as 'evaded by a method with which barristers, politicians and the cuttle-fish are familiar' (p. 129).

The universal applicability of the lymph-stasis theory of carcinogenesis seems remote. None the less, Handley's work cannot be read without a sense of respect for the detailed clinical observation it embodies, or a quickened interest in the histopathologic changes in what is still the relatively neglected field of lymph vascular disease.

A.G.O.

## CORRESPONDENCE : BRIEWERUBRIEK

### COMMERCIALISM IN MEDICINE

*To the Editor:* It is right that the Chairman of the Federal Council should decry Commercialism in Medicine and there are many who would whole-heartedly agree with his sentiments. In my brief experience of Medicine in the Cape, I have found as many examples of medical highwaymen amongst the older established and respected practitioners as amongst the younger ones, if not more.

It is the inalienable right of any doctor to practice medicine where he will, free from hindrance, and to accept as patients all those who would go to him because of his skill, his industry, his integrity and his hard work. This has been laid down as one of the tenets of the World Medical Association, and it is surely an unavoidable fact that the public, even before the profession, recognize the ability and competence of the practitioner.

South Africa is a rapidly growing country and a large proportion of the population are now having foisted upon them practitioners who are not of their individual choice. In fact, their right to choose a practitioner is denied for reasons which can only be described as specious. In the past there may in some areas have only been one doctor, so that it was immaterial whether the patients around were in a 'closed' or 'open' panel, since they only had the one doctor to go to; but with the opening up of the country and the increasing number of general practitioners, the 'closed' panel has become an iniquitous system.

*Appointments.* Appointment to the closed panel is by advertisement and application. Yet how many times has an appointment really been made before the advertisement appears? How often does one hear that so and so expects to get this particular appointment because his cousin is a member of the Company, or for some other reason?

Often an appointment is not given on grounds of professional competence, industry, integrity, or distinction in the profession, but for reasons that never come to public notice. Patients are thereby deprived of their free choice of doctor, and the doctor himself who accepts such an appointment often regards it as a permanent source of income, and only to a lesser extent a responsibility, since there is no competitive element or keenness necessary to enable him to retain his patients. I have heard it said by an elderly practitioner that he was thinking of taking things more slowly—anyway he did not need to worry because he had a Union appointment. In other words he felt as if his competence as a doctor was decreasing, and his inability to offer a satisfactory service would deprive him of his private patients. Those poor wretches who were forced to see him because they were under contract would provide him with an income, however poor a medical service he was able to offer.

It also meant that any young practitioner who was active in trying to get a practice in his area, and trying to compete on honest and vigorous terms in order to secure patients, would be prevented from doing so by a contract which might have been signed before he was either qualified or even a school boy. *This is Commercialism in Medicine of the most vicious type.*

Many practitioners holding large 'closed' panels, find themselves unable to carry out their work satisfactorily, and for this reason they take assistants who do the work and are thus farmed out on a salary basis. The work offers them no opportunity of advancement, nor permanent recognition. They are in dead-end jobs, working to provide another man with a living, often for a salary that does not compare with that of an ordinary tradesman. The reply of these seniors is that the young man is getting experience and tuition, but personal inquiry has shown that often this is not so. Newly qualified practitioners are sought for these jobs, and the whole responsibility is thrown upon them for a miserable pittance. Their time is wasted and their future unassured.

As the country advances and expands, more and more young practitioners will be trying to get a living and trying to set up practice; their future and the expansion of medicine in South Africa is threatened by this iniquitous system of 'closed' panels, which has to a large extent disappeared in every other civilized country.

*Certification.* The plea has been made that business men would have a more effective control of their workers through their control of a factory or works doctor, and would therefore be able to influence certification. This immoral suggestion has been seriously entertained and suggested as a reason for the continued use of the 'closed' panel. Since when has big business been the arbiter of justice? If any control of a practitioner is necessary, then his conscience or, in extreme cases, the Medical Council can guide him, but we resent any suggestion of outside control and it is not seemly that our birthright of independent medicine should be bartered to industry to suit the pockets of the older practitioner and the undisguised avarice of commerce.

We have been asked, if we press the point for an 'open' panel, not to make the matter retrospective, and to let those who already hold positions hold them indefinitely. This would be perpetuating an evil. We have been asked by the Chairman of Federal Council not to press the point too strongly, since it might offend some of the older practitioners in the country, who no doubt regard their ancient contracts as a pension for a time when they have passed their competence, and their declining years as meriting an income not compatible with their ability or energy. If a practitioner, with the passing of time, has gained the respect of his patients, then his practice will not suffer in competition with the younger men.

The matter is urgent. It requires drastic action to halt the claim-pegging and the immorality of the 'closed panel' system. The 'open panel' system is possible. It has worked and is working

in the Cape. More important, it is fair and good for the patient; it is fair and good for the doctor; and lastly, and most important, it is good for Medicine.

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9 January 1956

### CLOSED PANELS

*To the Editor:* One can agree with Dr. Sichel when he says that under certain circumstances closed panels are not only reasonable but desirable. Unfortunately the closed panel system in this country is being very much abused. Quite a few of the specialists with large panel appointments take on junior partners, or employ assistants to deal with panel patients, while they devote their own time to their private non-panel patients.

Surely if these specialists are unable to cope with the panels personally, they have no right to the appointments. The benefit societies concerned seem to turn a blind eye to this practice. The partner or assistant is just accepted to do the work while the appointment holder collects the salary.

When a specialist with a busy private practice, and often a hospital appointment as well, holds several large panel-appointments, it is obvious that the patients belonging to the panels will get the least of his attentions.

Either the closed-panel benefit societies must distribute their appointments justly, or members of the Association should continue to campaign for open panels.

*Panelled*

6 January 1956

### MEDICAL FEES

*To the Editor:* I was horrified to see last night's copy of the *Star* Johannesburg, and also their poster '*Doctor Criticizes Doctors*'. Whatever Dr. Sichel thinks about the commercial attitude of doctors he might be more circumspect in his statements. That article on the front page of the *Star* can only do the profession endless harm.

I agree with him entirely that the profession has become commercialized, but has he thought why?

Firstly, I blame Federal Council for their unrealistic attitude towards our profession, which they are supposed to be helping. As an example, a few years ago when the cost of living was just as high as it is today, they persuaded us through a referendum to accept a 10% cut in Medical Aid fees, as a couple of the medical aid societies were in so-called financial difficulties. I never agreed to this cut and was one of the prime movers in getting many colleagues in Johannesburg to refuse to recognize any society that paid us less 10%. The cut was quickly restored and in no time we got an increase in fees. This cut should never have been agreed to by Federal Council and this referendum should never have been held. The Council could easily have told societies that were in difficulties to put their own affairs in order.

Dr. Sichel has never tried to make a living out of general practice and so adopts quite an impractical point of view. Some of us with wives and families joined the Army in the last war and have been paying for it ever since. It is all very well for men like Dr. Sichel to talk when they are on the verge of retirement. He earned his living when the pound was worth a pound and now, no doubt, is in a position to retire.

When I started practice in Johannesburg in 1928, we charged 10s. 6d. for visits and consultations. In spite of the rise in living costs, in 1945 on leaving the Army we still received 10s. 6d.

Now we as general practitioners are beginning to realize the way we are being exploited by these various medical aid societies with the support of well-to-do specialists like Dr. Sichel. I would like to see him trying to make a living in Johannesburg today at 15s. 0d. a call and also to bring up a family. He might then begin to think commercially himself. Fortunately, I have my family off my hands at the age of 53 years, so now might be able to save a little for my old age. However, my sympathy is all with my younger colleagues who have still to educate their children. How they are going to do this, especially at private schools is beyond my comprehension.

Finally I would like to inform Dr. Sichel that the reason why the profession is becoming commercial in outlook is not to accumulate wealth but to make enough money to eat and live like normal human beings. In spite of our commercial outlook we, as a body, still do an enormous amount of *pro deo* work and I hope will continue to do so.

As Dr. Sichel is thinking of retiring, would he not do the profession a favour by retiring from Federal Council as well?

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5 January 1956

### CARCINOMA CERVIX UTERI—TREATMENT PRIORITIES

*To the Editor:* In being lucid, authoritative and provocative Dr. Ralston Paterson[1] made an ideal contribution to the recent Pretoria Medical Congress on this subject, and now he is to be congratulated on being as successful on paper as he was on the platform.

The annual improvement in the results which he has steadily achieved in a large Radiotherapeutic Centre over many years do him great credit and provide an inspiration for us to emulate his achievements. His story of achievement is also instructive when viewed *a tergo* because it provides a forceful reminder that very inferior results are so easily obtained in less experienced hands and under less favourable conditions.

Dr. Ralston Paterson's theme song is the forthright claim that radiotherapy 'alone' is the treatment of choice of carcinoma of the cervix and that surgery should be reserved for the 'failed or failing' radiation cases. Allow me to be equally frank in stating my view that surgery as an adjunct to radiotherapy can give results superior to those obtained by radiotherapy alone.

The premises of Dr. Ralston Paterson's arguments are mainly statistical and like the expert billiard-player he manoeuvres these into the desired positions to run up a convincing score. Suffice to say that statistics in support of the advantage of surgery combined with radiotherapy can also be produced.

The major weakness in his argument in support of the exclusive use of radiotherapy is concealed by his minimizing the frequency of lymphatic metastases in carcinoma of the cervix (stated at the Pretoria Congress to be 8% in Stage-I cases) and by emphasizing that 'present-day' radiotherapeutic methods can cure some of these. In actual fact the frequency of malignant node-involvement is approximately 30% (in Stage-I and Stage-II cases), and the frequency of their radio-resistance is probably in the region of 90%. Equally serious is the fact that—with rare exceptions—we are clinically impotent to diagnose malignant lymph-node extension in a particular case. We must also not lose sight of the fact that the finding of residual 'viable' carcinoma in the cervix is not an unusual finding when a Wertheim operation follows complete radiotherapy, and that—even in Dr. Ralston Paterson's expert hands—56% of women fail to survive 5 years when they suffer from carcinoma of the cervix, the percentage being far higher in the majority of centres.

What of Dr. Ralston Paterson's suggestion that surgery be restricted to 'failed or failing' radiation cases? This sounds so logical and simple that we fail to appreciate that, by the time the diagnosis of 'failed or failing' is made, the growth—or its extension—has more often than not spread beyond the realms of surgical curability. This is particularly the case after the clinician 'hands the case over' to the radiotherapeutist instead of persevering with his vital clinical responsibility in the team-work necessary to produce good results.

Every warrior has chinks in his armour plating but I contend that those I have revealed in Dr. Ralston Paterson's render him sufficiently vulnerable for me to cross swords with him, confident in the belief that an extended Wertheim hysterectomy (at the hands of those specially trained), as an adjunct to radiotherapy in Stage-I and Stage-II cases, may offer the chance of cure to 10 out of every 100 women who would otherwise have died from carcinoma of the cervix.

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1. Paterson, R. (1955): S. Afr. Med. J., **29**, 1228 (24 December)